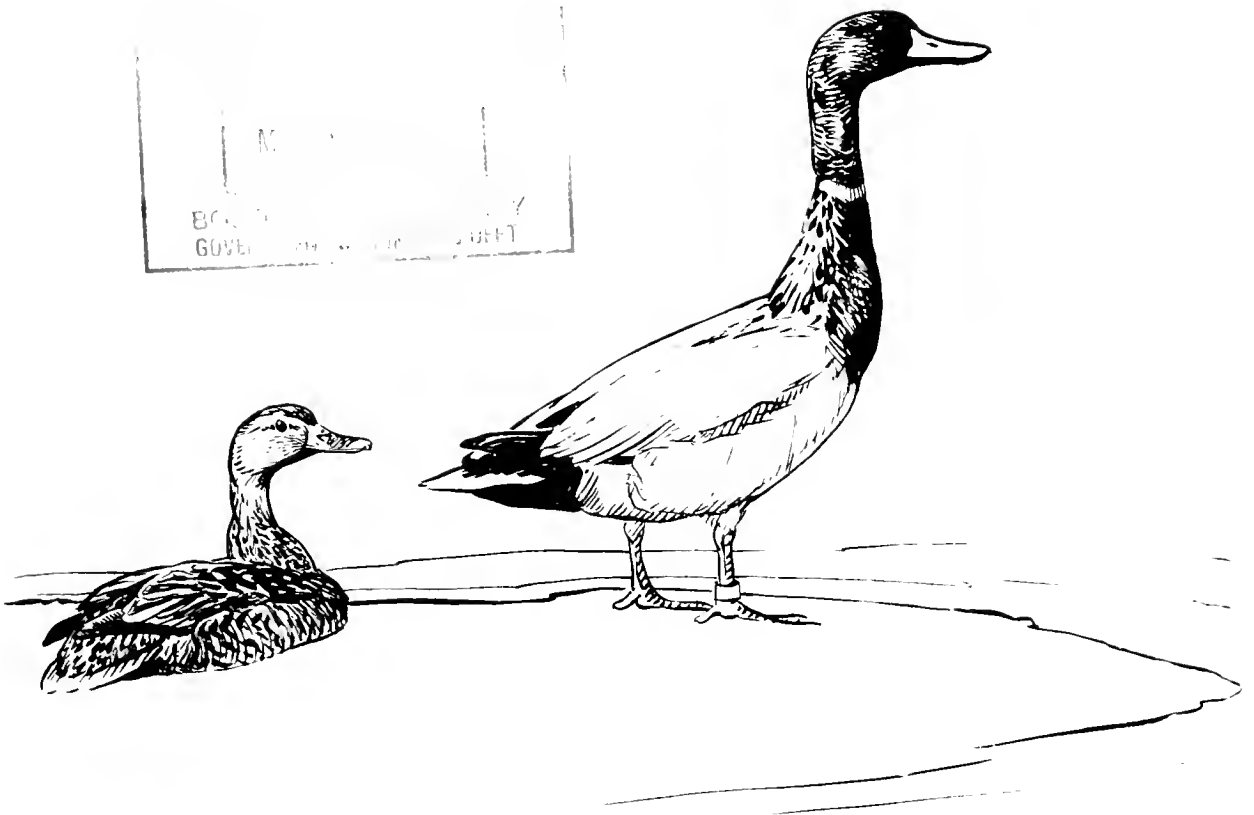


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WATERFOWL STATUS REPORT 1967



UNITED STATES DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE
Special Scientific Report--Wildlife No. 111

UNITED STATES DEPARTMENT OF THE INTERIOR, STEWART L. UDALL, *Secretary*
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Fish and Wildlife Service, Clarence F. Pautzke, *Commissioner*
Bureau of Sport Fisheries and Wildlife, John S. Gottschalk, *Director*

WATERFOWL STATUS REPORT 1967

Compiled and edited by

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DIVISION OF MANAGEMENT AND ENFORCEMENT

in collaboration with

DIVISION OF WILDLIFE RESEARCH



Bureau of Sport Fisheries and Wildlife
Special Scientific Report--Wildlife No. 111
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WATERFOWL STATUS REPORT



1967

The 1967 waterfowl hunting regulations were developed from four broad, closely related categories of information as herein reported. The groups of data are organized by flyways, from Pacific to Atlantic, with appendixes of tables to correspond.

Credit has been given to each individual or organization that submitted a report. Although many of the narrative statements have been briefed, and a few tables deleted or shortened if they contained data submitted previously or in another form the essential information from each report has been retained to the greatest extent possible.

WINTER SURVEY

During the first half of January a survey of winter waterfowl habitat and its effect upon the distribution of ducks and geese was completed by the Bureau of Sport Fisheries and Wildlife with assistance from State fish and game departments, other Federal agencies and private individuals. All important waterfowl wintering areas in the country were covered.

Pacific Flyway

Record rainfall in western Washington increased habitat. Natural aquatics were readily available in eastern Washington, but cultivation reduced the food supply. Food and water conditions were good in western Montana and Oregon, but poor in Nevada. The food supply was adequate in Idaho although water levels were generally low.

An early rice harvest followed by burning and plowing greatly reduced available food in California. Utah had poor food and water prior to the survey and inclement weather also forced waterfowl out. Drought hit southern Arizona and all lakes above 4,000 feet were frozen, with birds concentrated on the springs and rivers in the north.

The dabbling duck count was increased slightly from last year, mostly in California and Idaho. Divers were counted at about the same level.

Because the census conditions were much better than last year, increases were noted in the goose population, with snow geese more than double last year's count, mostly in California and Nevada. The white-fronted goose numbers also doubled, while brant population showed no change.

Central Flyway

Late December storms and cold weather forced birds into favorable habitat in New Mexico, Oklahoma, and Texas. Kansas drought concentrated waterfowl on large reservoirs. Water levels were below normal in Nebraska, and most water areas were partly or completely frozen.

Availability of grain was restricted by snow cover in Kansas, Nebraska, the Dakotas, and Wyoming. Food and habitat were good to excellent in Montana and in southern Texas, where grainfields had not been plowed.

Dabbling ducks in the Flyway showed a slight to moderate increase over those seen last year, with greatest increases in Oklahoma and New Mexico. More divers were noted, mostly redhead and ruddy ducks in Texas, indicating good conditions in coastal marshes and lagoons.

The number of geese counted was slightly above 1966.

Mississippi Flyway

Habitat in all States except Louisiana was about the same as during last year's survey. In southwestern Louisiana,

where most wintering waterfowl have concentrated in recent years, food conditions in coastal marshes were poor due to high water during the growing season. Field-feeding species found good conditions in ricelands and swamps farther inland. For the first time in many years, southeastern Louisiana held more waterfowl than the southwestern area.

The Mississippi River and tributaries were low, thus reducing habitat.

In the northern part of the Flyway waterfowl were more concentrated due to snow and ice cover. The lack of snow from Illinois southward made waste grain available and surface water from rains helped distribute the birds. Generally, wintering areas appeared in excellent condition.

Fewer dabbling ducks were observed in the north, but more were seen farther south. Diving ducks decreased moderately in Michigan, Iowa, Illinois, Kentucky, and Tennessee, but increased considerably in Minnesota, Wisconsin, Arkansas, and Ohio.

The numbers of geese observed were about the same as last year, with fewer snow geese in Iowa and Missouri, greater numbers of Canada geese in Missouri and Illinois.

Atlantic Flyway

The majority of northern fresh water areas and some tidal marshes and bays were frozen, concentrating the birds. Food and water conditions were excellent in most of Florida, but a poor mast crop in bottomlands of South Carolina caused a mid-December departure of puddle ducks.

Scoter were abundant in Georgia and South Carolina, but no large concentrations of scaup were noted. Observers reported fewer ring-necked ducks and scaup in Florida. Fewer ducks were seen this year in the Atlantic Flyway, but more geese were observed. Canada goose populations were steady, with more brant in New York, New Jersey, and Virginia, and more whistling swans in Maryland and North Carolina than last year.

Tables A-1 and A-2 of the appendix summarize the winter survey.

BREEDING GROUND SURVEYS

ALASKA AND YUKON TERRITORY

James G. King, Bureau of Sport Fisheries and
Wildlife

and

Peter E.K. Shepherd and Ben Hilliker, Alaska
Department of Fish and Game

Weather and habitat conditions

Alaska enjoyed an early spring this year except in the Northwest. Favorable conditions enabled the birds to migrate easily and disperse immediately to the nesting areas. People in Juneau, Anchorage, Fairbanks and in many villages remarked on the scarcity of ducks this spring. This indicates the birds did not have to "hold for weather" but moved right on through.

Warm weather in April and early May evaporated much of the snow prior to the true thaw; thus, flooding was almost nonexistent. Water levels in the lakes of the interior remained low. In contrast to more southern areas low water levels in the Yukon drainage seem to produce optimum conditions possibly because of an increase in shoreline and islet nesting habitat and higher water temperatures during the summer. Weather remained favorable throughout the summer.

Breeding population indexes

The breeding population index of 1.1 million ducks was essentially the same as in 1966, but down 19 percent from the 10-year average. Dabbling ducks increased in the interior and more than held their own on the coastal areas

except for pintails. The pintails of the interior increased 26 percent but dropped 21 percent in the western tundra areas, possibly reflecting quite different nesting conditions in these two areas last year. Scaup decreased sharply in all areas.

Goose nesting was a week to ten days earlier than last year and weather conditions were favorable. Brant nests were up 10 percent with a 9 percent increase in brood sizes at hatching. Other geese appear to be doing equally well. Swan averaged five eggs for a 20 percent increase in clutch size from last year, the highest figure in 5 years of records (tables B-1 to B-5).

Production indexes

There was a 30 percent increase in duck broods counted on the two production trend areas with all species up except widgeon (table B-6). Production prospects for brant, geese, and swan on the Yukon Delta appeared to be excellent.

NORTHERN ALBERTA
NORTHEASTERN BRITISH COLUMBIA
AND NORTHWEST TERRITORIES

Data supplied by Edward G. Wellein and
G. Hortin Jensen, Bureau of Sport Fisheries
and Wildlife

Weather and habitat conditions

Late winter and early spring in the Northwest Territories were characterized by temperatures below normal. This past May was one of the coldest on record.

The precipitation pattern during the same period was irregular and generally below normal, except in the southern Mackenzie valley in February and the extreme northern part of the survey around Inuvik in May.

The spring season in the southern and western portions of the survey area advanced normally where aspen were well-leaved. To the east conditions were delayed, and especially east and north of Great Slave Lake where the larger lakes had not opened and smaller lakes had refrozen because of a cold snap in early June. Yellowknife experienced a 2-inch snowfall on June 7.

The net result was a waterfowl breeding season delayed at least one to two weeks.

Breeding population indexes

The total waterfowl population index was 15 percent below the average of the past 10 years but compared to 1966 showed no change. Canvasback and redheads are still below average. Dabbling ducks showed a decrease from 1966 and are 50 percent below the 10-year average. The mallards were slightly in excess of last year but other species were generally below 1966 and the average. A return to better habitat conditions in the prairies and parklands may have held many of the dabbling ducks south this year.

For statistical analysis the nine strata were combined, and the sampling error was 15 percent of the mean. The population would be 3,389,600 ducks, \pm 368,950 (tables B7-8).

Coots were observed only on the Athabasca Delta in very small numbers.

CENTRAL AND SOUTHERN ALBERTA

Data supplied by K. Duane Norman
and R. David Purinton, Bureau of
Sport Fisheries and Wildlife

Methods

During the winter of 1966-67, an analysis of variance was completed for the southern strata in Alberta. It was determined that a 50 percent decrease in effort was warranted in strata 26 and 27. Three new transects were added in stratum 13. No change was made in stratum 28.

The starting points for several transects were also re-located so that each started at the Saskatchewan border and ran westward until waterfowl habitat was no longer encountered. Thus, the transects contain a varying number of segments each of which is 18 lineal miles. No partial segments are included in the survey. Authorization was also obtained from the Director, Civil Aviation, Department of Transport, to overfly the restricted areas in Alberta, so that all waterfowl habitat is now included in the survey.

The total area of each stratum was recalculated as follows: stratum 13 - 56,700 square miles; stratum 26 - 24,600 square miles; stratum 27 - 26,100 square miles, and stratum 28 - 13,200 square miles. All of the past data was back-calculated and expanded to conform to the new strata acreages, thus making direct comparisons with current and past data possible.

Weather and habitat conditions

New temperature and precipitation records were being established almost daily during the first two weeks of May. In Calgary on May 10th, 34 degrees was recorded to establish the lowest maximum for the date and on May 11th, a new record low of 22 degrees was recorded. In Lethbridge during the previous 30 days, 70 inches of snow fell and 80 inches fell in the Pincher Creek area. The last two weeks of May were relatively cool and dry.

Waterfowl habitat conditions were the best they have been in southern Alberta since 1960. A snowstorm and low temperatures on April 29 caused widespread damage but provided the necessary moisture at a critical time which maintained

excellent habitat well into the summer. Survey flights were made on May 7 and 12 during which it was determined that from 6 to 18 inches of snow covered the ground from Stavely to the United States border and from Pincher Creek to the Saskatchewan border. Nearly all of the permanent ponds were frozen over throughout southern Alberta. Eagle Lake just east of Calgary contained huge ice floes even as late as May 23. Sylvan Lake and Gull Lake near Red Deer were also ice laden.

There was an increase in the May water index of 75 percent from last year in stratum 28, but most of this was temporary and had disappeared along with 34 percent of the permanent water by mid-July.

In stratum 26, little change in habitat conditions was evident from last year. Range conditions appeared good and farming operations were well underway. Most of the permanent potholes were full or nearly full from Claresholm to the Brooks area and north to Sullivan Lake and west to the Clearwater area. Emergent aquatics had grown to heights of about 6 inches in the Calgary area to heights of 9-10 inches in the Hanna-Olds-Red Deer-Stettler areas. As the survey progressed northward, habitat conditions and the progress of the season appeared more normal. A little snow still remained in the sheltered areas west of Olds.

There was a decrease of 17 percent in the May water index in stratum 26. This shrunk by another 30 percent by the mid-July production survey.

Water and habitat conditions were very nearly normal in stratum 27. The Sounding Lake and Sullivan Lake water levels have raised considerably from last year and now only lack a few feet from being full. In the Stettler-Camrose area, most of the trees were fully leafed and the emergents were 12-14 inches in height.

Permanent water areas in stratum 27 increased only about 2 percent from last year (table B-9).

Although we have no basis for comparison, water levels and habitat conditions in stratum 13 appear normal. All of the permanent lakes and ponds were ice-free and water levels were high.

Breeding population indexes

The total waterfowl population index for southern Alberta increased about 22 percent from last year. Greatest increases were noted in the dabblers which are almost at the

level of the long-term average. Gadwall, blue-wings, pintail, widgeon, green-wings, and shovelers show substantial increases. The mallard population increased only about 10 percent. In stratum 13, only the gadwall, shoveler, and pintail populations increased. The other dabblers decreased substantially from last year.

The total diver index increased about 18 percent from last year in southern Alberta with greatest increases noted in ruddy duck, canvasback, bufflehead and redheads. In stratum 13, only ruddy ducks increased. The overall diver index decreased 32 percent from last year in this area.

Canada geese overall increased about 75 percent from last year and the long-term average, but the goose population along the major rivers south of Red Deer decreased about 25 percent. Heavy rains and flooding all but eliminated goose production in these rivers.

Cost populations increased greatly from last year and are well above the long-term average in the southern three strata but decreased 33 percent in stratum 13.

The lone drake index for mallards was greatest in stratum 27, near average in stratum 26 and much below average in stratum 28. The pintail index was highest in stratum 27 but only slightly lower in the other strata. The canvasback index was above last year. The overall drake index indicated that the season progressed more rapidly than last year, the late spring and other indicators, notwithstanding (tables B10-13).

Waterfowl production indexes

The breeding pair survey in May indicated an increase of 25 percent in the breeding population in southern Alberta but the production survey yielded data to the contrary: in fact, a decrease of 4 percent from last year. This year's brood index was 25 percent below the 10-year average.

Although the brood index increased 64 percent from last year in stratum 28, it was anticipated that the increase would have been much greater. The birds in this stratum during May were lured to the apparently excellent habitat perhaps to their own detriment. If nesting were initiated, a high percentage of the nests was most certainly destroyed by the farming operations. Perhaps renesting occurred to the north, although the data for strata 26 and 27 failed to indicate that this was true.

The brood index for stratum 26 increased 8 percent from last year but it decreased 18 percent in stratum 27. A

larger number of class I broods and fewer class III broods were observed which may not only indicate the lateness of the season but that broods from renesting attempts were just beginning to appear in late July.

The average brood size decreased 6 percent in stratum 26, 5 percent in stratum 28 and 15 percent in stratum 27.

WASHINGTON

Data supplied by Robert G. Jeffrey
and Ellis L. Bowhay, Washington
State Game Department

Weather and habitat conditions

Following a winter of average precipitation and a wet April, pothole conditions in eastern Washington had improved perceptibly by May. There were 27 percent more water areas than in 1966. This was still 10 percent fewer than the average of the past 5 years, and represented about one-third of the potential of the region. However, by mid-July the number of potholes with water was once again near the all-time low.

The cool, wet early spring caused less water to be used on the irrigated farm lands. Thus, reduced run off water affected the quality of the breeding habitat in these areas. Another factor which may have contributed to a lessened production success was the prolonged period of high water in some of the major river valleys during the spring run off.

Breeding population indexes

In 1967 the adult ducks on the breeding grounds of Washington numbered about 130,000, 11 percent below that of last year. Most of the decrease was in the dabbling ducks, and all areas of the State, except the pothole region, shared in the decline (table B-14).

Production indexes

Estimates of duckling production were based upon follow up brood counts on most of the transects. The resultant brood-pair ratios were compared with the long-term averages to determine nesting success values. The fall flight index of 338,500 ducks was 11 percent below 1966. The percentage of young ducks in the index was 61, about the same as for the 1966 season. Except for the pothole areas, duck production was down throughout. The mallard index and that of a few lesser species was up slightly from the previous year (table B-15).

The production index for Canada geese was 11,300, a slight decrease from 1966. Even though nesting success and brood size was greatly improved in most areas surveyed, concentrated predation on two high-density nesting islands, plus dam construction activities, resulted in a decline in total gosling production.

OREGON

Data supplied by Chester E. Kebbe
Oregon State Game Commission

Weather and habitat conditions

The mild winter of 1966-67 was followed by a cool, wet spring which allowed evaporation and preserved water in the major marshes at near normal levels. Habitat conditions were greatly improved with heavy stands of emergent vegetation and good nesting cover in all breeding areas.

Evaporation losses were light, and by mid-July most marshes and potholes contained sufficient water to last through the production period.

Production indexes

Excellent goose production resulted throughout the eastern Oregon breeding range. The number of young recorded on established transects indicate an increase in production of 7 percent from 1965 and 19 percent from the previous 5-year average (table B-16).

Good water conditions in all production areas resulted in a dispersal of dabbling ducks from the large marshes to adjacent lakes and marshes. An increase of 43 percent was recorded in production of dabblers but a decrease of 68 percent in divers. Fair to good production of divers was anticipated, however, as the late spring caused delayed nesting, and the heavy marsh vegetation made an accurate census impossible. The indicated decrease in divers was probably more apparent than real (table B-17).

The production estimate for Malheur Refuge (not included in tables) was 18,000 ducklings, an increase of 38 percent from the 13,000 production in 1966, but 18 percent below the average of the previous 5 years when habitat conditions were ideal.

CALIFORNIA

Data supplied by W.D. Bailey,
F.M. Kozlik, Harry George, and
T.B. Stone
California Department of Fish and Game

Weather and habitat conditions

Water and habitat conditions in northeastern California were excellent this year, the best on record since these surveys were started in 1949. All of the permanent water impoundments and marshes were full. In addition, every swale and low-lying meadow had ample water to produce birds. It is evident that many birds moved out onto this temporary habitat which is not covered on the survey flights. Spring

was late, and at higher elevations the snowpack further delayed nesting. Many Canada goose did not hatch until mid-June (tables B18-19).

The Central Valley also received above normal amounts of rainfall to the extent of flooding. For the first time in 10 years water poured onto the farmlands in the basins of Tulare, Hacienda and Buena Vista Lakes. Thousands of ducks and coots remained to nest in these areas that are not covered by the survey transects. Normally, most of the nesting habitat is composed of artificial and regulated water impoundments such as rice fields, grasslands and pasture areas. This year, with the good water conditions, many birds (mostly mallards) scattered out to nest in the swales and flooded meadows of the foothill grazing areas.

Breeding population and production indexes

Comparable figures of nesting pairs and production of waterfowl are presented in tables B-17 and 18.

UTAH

Data supplied by John E. Nagel
Utah Fish and Game Department

Weather and habitat conditions

The winter of 1966-67 provided Utah with average amounts of precipitation. Spring storms and above average amounts of run-off created optimum nesting conditions for waterfowl throughout the State. All managed marsh areas in the State were in excellent condition when breeding waterfowl returned this spring. Natural marsh areas around the Great Salt Lake and wetland areas in eastern and southern Utah also were enhanced by above average amounts of precipitation and run-off. Wetland habitat throughout the State remained in excellent condition throughout the spring and early summer.

Continued wet and cool weather placed little demand on waters stored in irrigation reservoirs. This resulted in

sustained high flows into managed marsh areas in northern Utah and slower than average deterioration of natural marsh. With average amounts of precipitation the rest of the summer, wetland habitat throughout the State remained in excellent condition during the summer and fall.

Breeding population and production indexes

Aerial surveys indicate a fairly substantial increase in breeding ducks on northern Utah trend areas. Ground counts on managed marsh areas indicated little or no increase in breeding birds from 1966 levels. However, better habitat conditions throughout the State and especially in areas immediately adjacent to developed marshes accounted for significant increases in the number of birds utilizing these areas and in the amount of habitat available to breeding waterfowl.

Breeding populations of mallards, redheads, gadwall, and shovelers on major census areas were normal. Redheads and ruddy ducks showed a marked increase in breeding pairs on all census areas. No major shift in species composition between northern and southern breeding areas was noted (tables 20 and 21).

Canada goose brood counts indicated below average production of Great Basin Canada geese throughout the State. Major production areas in northern Utah including Bear River Migratory Bird Refuge indicated a decrease in numbers of breeding pair and goslings of more than 50 percent. Production areas in the remainder of the State reflected the same downward trend although not to the extent around the Great Salt Lake (table B-23).

Several interrelated factors including weather, habitat changes, and hunter success during the 1966-67 waterfowl hunting season apparently combined to decrease goose production in Utah this year.

IDAHO

Data supplied by Elwood G. Bizeau
Idaho Fish and Game Department

Weather and habitat conditions

Water conditions for ducks and geese throughout the State were judged to be excellent during the 1967 production season. Snowpack from the previous winter was well above normal. Run-off brought streams to flood stage on several drainages and was damaging the production for two segments of the eastern Idaho goose flock but the abundant water was favorable for duck production.

Spring movement of waterfowl was slightly retarded but the birds appeared to pass through in normal numbers. The phenology of the nesting season was a few days late for geese and normal for ducks.

Breeding population indexes

The aerial goose count for all southern Idaho units combined indicated an overall increase of 18 percent from 1966 in adult geese present on Idaho breeding areas and 42 percent higher than the 12-year average. This increase was general except for Dingle Marsh and the south fork of the Snake River. The status of adult breeding and nonbreeding geese at the start of the 1966 production season was good (table B-24).

Production indexes

Production from the good supply of goose breeders was 7 percent below 1966 and slightly below the long-term average for all goose units combined (table B-25).

While the resident goose flocks of southwestern Idaho had a normal production year, conspicuous production failures because of a variety of causes occurred in almost all eastern Idaho units.

The migratory breeding flock of eastern Idaho produced goslings at a rate of 22 percent below 1966 and 23 percent below the long-term average. The surveys indicate a

substantial reduction in the fall flight of geese from eastern Idaho that filter down the Flyway through Utah and Nevada to winter in southern California and Arizona.

Because of a change in personnel, no comparable duck production trend routes were operated in Idaho during 1967. Based on general evaluation of the production season from experienced observers in waterfowl areas in the State, the good water year of 1967 resulted in excellent duck production throughout southern Idaho.

MONTANA

Data supplied by Alva E. Weinrich and Donald W. Combs

Air Crew

Kahler Martinson, Raymond Buller, and Ashton W. Brann

Ground Crew

Bureau of Sport Fisheries and Wildlife

Weather and habitat conditions

Habitat conditions varied from fair to excellent with an island of poor conditions in the central area. Seasonal moisture totals, including snowpack and rain, were above normal, generally, except as noted above. Two late spring blizzards hit eastern Montana April 29 to May 2 and May 10 to 13. The May Day storm hit southeast Montana and north of the Missouri River with up to 3 feet of snow, freezing the small water areas. Some coulees, small ponds, and streams were drifted full. The May 10-13 storm was not as severe, but up to one foot of snow fell in some portions and rain fell in others. Sheet water was present throughout the survey area with some of lasting quality for production. Some flooding occurred; however, most of the water appeared to be absorbed and melting residual snowbanks furnished some moisture for quite a period of time.

The season was delayed temporarily by the storms and cool temperatures as reflected by the low lone drake index in stratum 40. However, by the time stratum 41 was surveyed, the lone drake index was comparable to the 1965 and 1966 years on mallard and pintail. Rains since the end of the

survey were liberal in eastern Montana. Up to ten additional inches had fallen in portions of that area by June 7. The Roundup area received heavy rain and flooding which was the island of dry noted above.

In stratum 40, a number of stock dams, both on and off the transect, were washed out which could account for some of the decreases in the water index. In 1965, the ratio of stock dams to semipermanent, temporary, and streams was about 2 to 1; however, in 1967, the ratio in May was close to 1 to 1 in stratum 40. More stock dams may have been washed out from flooding after the May survey was completed.

Breeding population indexes

Stratum 40 had a mean density of 4.2 ducks per square mile (1.8 per water area) for an adjusted breeding population index of 136,700. Mallards comprised 22 percent; blue-winged teal, 12 percent; pintail, 11 percent; green-winged teal, 9 percent; widgeon, 9 percent; shoveler, 8 percent; gadwall, 5 percent. Divers, with scaup, redhead, and mergansers being the most important in that order, comprised the remainder.

Stratum 41 had a mean density of 12.2 ducks per square mile (6.4 per water area) for an adjusted breeding population index of 594,400. Pintails were most abundant, 40 percent; followed by mallard, 14 percent; blue-winged teal, 10 percent, green-winged teal, 9 percent; widgeon, 8 percent; shoveler, 7 percent; gadwall, 5 percent. Divers, primarily scaup and redhead, comprised about 7 percent. Canada geese had an unadjusted index of 475 in stratum 40, and 6,800 in stratum 41.

The adjusted total duck population index in 40 and 41 was slightly higher than the two previous years; however, the total pond index was down 20 percent compared to May, 1966 (see tables B26-29).

Air-ground comparison discussion

In stratum 40 and 41 of Montana, a block type ground-air comparison area is used to determine visibility rates. These areas normally contain 50 to 100 water areas, primarily stock dams, a few streams, and a few dugouts and natural potholes and lakes. Observations are made only on stock

dams and dugouts, which are numbered or given a letter identification. The ground crew can cover the water areas in two to four days and the air crew can cover these in two to three hours flying time. This year it was felt that if both crews could cover at least 50 of the same water areas, that an adequate sample could be had to determine a visibility rate. There is some change from year to year by dams being dry and new stock dam and dugout construction. Access difficulties due to rains, fences, road conditions, and not knowing locations of new construction, are some problems for the ground crew. The positive identification of ponds is a problem to both crews. It would be desirable to mark each dam so that the air and ground crew would know they were covering the same water areas. In instances where ponds are quite close together, or if a stream or lake is adjacent, it is possible that the air or ground crew could flush birds onto an area that would not be counted. It is also a possibility that birds would be counted twice. The air crew flies the ponds in an east or west direction at transect altitude and speed. They count the entire water area on one pass and divide the ponds between the observers and pilot equally. Larger ponds were divided by flying down the center. Last year, the Carter County comparison area was run, but this year it was dropped. This year, it was noted that this area was flooded by Box Elder Creek and the roads would have been impassable. Another comparison area was set up in stratum 41 near Chinook, but was not run this year because of muddy roads and lack of time by the ground crew.

Three ground-air comparison areas were run this year. They were McCone, Musselshell, and Wolf Creek. Wolf Creek is in stratum 41 and the other two in stratum 40.

McCone: This area has at least 69 water areas of which the ground crew and air crew covered 57 of the same. More mallards were observed by the air crew than by the ground crew resulting in a higher visibility rate. This was true last year and I have no explanation for this fact. The approximate size of this area is 300 square miles.

Musselshell: This area has at least 118 water areas of which the air crew and the ground crew covered 76 of the same. The ground crew counted more ducks of all species than did the air crew. This area needs pond marking badly as it has some very confusing ponds for the crews. Perhaps it could be cut in size from the present approximate 300 square miles, if we

only need 50 ponds to determine a visibility rate.

Wolf Creek: This area has at least 63 water areas of the stock dam-dugout type plus a couple of natural lakes. The ground crew and air crew counted 55 of the same areas. This area is about 200 square miles in size. The air crew observed more than twice as many mallards, and more gadwall, scaup, and ringneck than the ground crew. This causes visibility rates, when applied to the unadjusted index, to distort our transect data.

The McCone-Musselshell visibility rates were used together for stratum 40 and a combination of all three for stratum 41.

The additional comparison area out of Chinook should be run to give a better idea of what is happening. It might be advisable for the air crew to run study area twice about 3 or 4 days apart and see what results are obtained. The upset season itself is apt to be the cause of the discrepancies more than anything else. I would like to see the air crew, the ground crew, the Washington office, and the Patuxent Research representatives discuss the block comparison techniques and determine if they are realistic in practice and to develop an operating procedure standardization to be put in written form.

New maps with readily identifiable numbers and new aerial photo maps should be obtained.

CHIPPEWA NATIONAL FOREST
MINNESOTA

Data supplied by Jay Janacek
Minnesota Department of Conservation
John Mathisen
U.S. Forest Service
Lew Cowardin, David Gilmer,
Harry Pinkham and Bill Ellerbrock
Bureau of Sport Fisheries and Wildlife

Weather and habitat conditions

The water level in the Mississippi flowage had been drawn down through the winter months but approximately 8 inches of rainfall in April, May and June increased the level to 10.9 as of July 1. This had receded to 10.7 inches at the time of the census or .3 above normal. Mud Lake was approximately 2 feet below last year. Low water conditions made this area impossible to census.

Emergent and subsequent vegetation was about the same as last year with a slight improvement in the wild rice growth but a more sparse growth of hardstem bulrush. The Third River area appeared to have islands forming by the movement of cattail bogs creating small openings and channels.

Breeding population indexes

The population index and adult-young ratio are summarized in tables B-30 and B-31.

NORTH AND SOUTH DAKOTA

Data supplied by Gerald Pospichal,
Marshall Stinnett, Alva Weinrich and
Donald Combs
Bureau of Sport Fisheries and Wildlife

Methods

Major revisions in the survey coverage in the Dakotas were instituted in May of 1967 after an analysis of variance of previous years data was completed during the winter of 1966-67. The total coverage was increased by 30 percent; strata 29 by 200 percent, 30 by 40 percent, 32 by 60 percent, 34 by 30 percent, and stratum 33 decreased by 10 percent.

No changes were made in the stratum boundaries. All air-ground comparison transects were flown, one pass in each direction.

Weather and habitat conditions

Light snows were common through the east two-thirds of North Dakota during December and early January with heavier snows to the west. Precipitation for the period was generally light in South Dakota. Temperatures were generally above normal for January with less than normal winds. Snow drifted well in the North Dakota pothole basins. A warm trend in early April caused fair runoff in the north part of the area, but the south remained dry. Early migrations were about normal. By late April the first teal had appeared in central North Dakota, and coots were present in good numbers. Early nesting was in progress. Two successive storms with heavy wet snow and freezing temperatures hit North Dakota (all except for the southeast corner) in late April and early May. The cold and snow held until May 8 in most of the area. Early nestings were destroyed and some die-off of waterfowl was reported. Coot were hit the hardest (table B-32).

Breeding population indexes

As in the case of water indexes, comparisons of the breeding population indexes were made only for strata 30 and 33 in North and South Dakota. These were formerly designated as "central". Total ducks (unadjusted) were up 20.7 percent from 1966 and up 24.6 percent from the 1960-1966 average.

Divers were down 29 percent from 1966 but up 6.5 percent from the average. Canvasback, redhead, and scaup were down significantly from 1966 but canvasback showed an increase from the average. Total dabblers were up 28.9 percent from 1966 and 26.5 percent from the average. Mallards, pintail, gadwall, and shoveler all showed increases. Blue-winged teal, though up from 1966 by 20 percent were 5.9 percent down from the average. Coot populations are down 10 percent from 1966 but are still 51 percent above the long-term average (tables B-33-36).

Waterfowl production indexes

In comparing only strata 30 and 33 the duck brood index was about the same as 1966. Average brood size was down 18 percent from 1966. The best production was in strata 30, 33, and 34 but better than 50 percent of the broods observed were in class I, indicating the very late season (table B-37).

MINNESOTA

Data supplied by G. Pospichal,
M. Stinnett, M. Smith and R. Droll
Bureau of Sport Fisheries and Wildlife
R. Jessen and P. McFall
Minnesota Conservation Department

Minnesota biologists conducted aerial surveys of breeding waterfowl populations in the State over a number of years. The Bureau also surveyed part of Minnesota and incorporated its results in the report for the tri-State survey area. The identity of the individual State data was not readily available in this tri-State report.

Both Minnesota and the Bureau desired a better estimate of breeding waterfowl populations in that State. In May 1967, the two agencies jointly completed an intensified survey of Minnesota's breeding waterfowl populations.

The various Minnesota strata were not all flown during the same period. Other assignments plus a late spring resulted in the rather long survey period this May. Background

information on Minnesota weather and habitat are omitted from this report as were calculations of lone drake indexes and a forecast index for the State. These refinements can be added in subsequent years as the survey is continued and comparative data become available.

Breeding population indexes

The unadjusted State breeding population index was 174,200 ducks (table B-38). The aerial indexes adjusted for visibility yield the waterfowl populations shown in table B-39. These adjusted data appear reasonable but should be viewed with caution since each air crew's data were corrected by only one air-ground transect. The number of air-ground transects were too few and these transects did not sample all habitat types.

Production survey

There are no data from previous years that are directly comparable to the 1967 data. The 1967 changes in strata boundaries and transect locations require a reworking of earlier data before useful averages or norms can be established.

In stratum 45 and 47 the brood index totaled 2,950 and yielded .16 broods per square mile. The late nesting index was 9,100 indicating only limited additional production could be expected from the area surveyed.

It may be of some use to guess at the probable production for the entire survey area in Minnesota. If production in strata 46 is similar to that found in 45 and related to May breeding populations estimated production in 46 as follows:

70,600 breeders is to 2,950 broods counted in stratum 45 and 47 as 101,100 breeders is to 4,224 broods in stratum 46.

If production was very low in strata 42-44, as believed, then the 1967 Minnesota brood index might be on the order of 7,000 to 8,000 broods.

Similar reasoning yields a late nesting index of 21,000 for the entire survey area in Minnesota.

NEBRASKA

Data supplied by John Sweet and George
Schildman
Nebraska Game, Forestation and Park
Commission

Weather and habitat conditions

Water conditions throughout the Sandhills and Basin area of southcentral Nebraska were poor during the spring waterfowl migration and breeding periods. The water index during the May survey was 12.5 percent below the 1966 survey for the same period. General rainfall since the survey helped to improve conditions in some areas, however. The July water conditions were only fair throughout the Sandhills area, though many areas were drying rapidly.

Weather conditions were cooler than normal during the month of June. Both high and low extremes in temperatures were experienced during the last two weeks of July.

Breeding population indexes

Aerial transects were flown for breeding pairs during the period May 15 through May 22, 1967 in the Sandhills breeding area. The 1967 breeding population index for the Sandhills area was calculated to be 19.2 percent below that of 1966. Surveys were not made in the Rainwater Basin area in the southcentral portion of the State because of the lack of habitat (table B-41).

Production indexes

Aerial brood transects were flown over the Sandhills production area during the period July 23 through July 28, 1967.

A total of 34 broods were observed during the July survey. Good counts were obtained on all broods observed which had a total of 167 ducklings. The number of broods observed was 29.2 percent below the 1966 figure, while the number of ducklings was 30.4 percent below that of 1966. The duckling/brood figure of 4.91 was considerably below the 1966 figure of 5.58.

The hatch in the Sandhills area was considerably later than normal. New broods were still evident during the last week of July. The percentages of ducklings sighted during the

July aerial surveys for classes I, II and III respectively were 12.6, 44.9 and 42.5.

COLORADO

Data supplied by William H. Rutherford
Colorado Game, Fish and Parks Department

Weather and habitat conditions

Weather conditions in Colorado during the spring and early summer were generally good to excellent for nesting waterfowl. Winter snowpack, although not extremely heavy, was late in melting due to a cold spring season. Water supplies were generally good, both from reservoir storage holdover from last year and from heavy spring precipitation. The effect of the wet spring was noticeable in all waterfowl breeding grounds of the State, where nesting habitat was quite abundant. The San Luis Valley was a possible exception; early water was somewhat less abundant than in past years, but recovered during the rainy months of May and June.

Breeding population indexes

Examination of the duck breeding-pair estimates by area reveal that the 1967 counts were 28.4 percent above those of 1966, and 51.2 percent above the 1954-1966 13-year average.

All areas showed increases from both 1966 and from the long-term average, with North Park, the Cache la Poudre Valley, and Browns Park showing the greatest increases.

Species composition of the breeding duck population showed only minor changes. Shovelers and redheads were down somewhat, teals (all species) were up considerably, and other species remained stable (tables B42-43).

In 1967, the western slope Canada goose breeding area showed an increase in number of geese and total gosling production over both last year and the long-term average. Flock size was the largest ever recorded since the survey was initiated. Extreme high water did not occur at any time during the spring. Nest hatching was nearly completed at the time

of the survey, all hatched nests which were observed and remained high and dry, and no evidence of nest flooding could be detected (table B44).

The Yampa and Little Snake Rivers continue to contribute most of the volume of production and total geese observed, but the Green River is making a rapid and spectacular recovery following the years of construction of Flaming Gorge Reservoir. The flow of the Green is now well stabilized, and in addition, development work on the Browns Park National Wildlife Refuge has progressed to the point that many sloughs (dry ever since the spring floodwaters have been controlled) are filled by pumping from the river. It appears that the production habitat in Browns Park is fast approaching the level existing during the "good" years of the 1950's. The current surveys indicate an above-average production year and a continuation of the excellent status of the Canada goose flock in Moffat County. The management objective continues to be to increase the size of this flock, particularly because of the increase in habitat quantity and quality in Browns Park.

WYOMING

Data supplied by George Wrakestraw
Wyoming Game and Fish Commission

Weather and habitat conditions

Much of Wyoming was in a dry condition at the start of migration. Many so-called permanent ponds were dry and of no value. During early May a heavy snow of severe blizzard proportions hit northeast Wyoming and the resultant runoff brought stock ponds up to near normal capacities. Heavy rains followed the snow during the latter part of May. Range and water conditions continued to improve through June and into early July. Agricultural forecasts indicated one of the best range years experienced in modern history. Stock ponds and reservoirs remained at maximum levels through July and assured ample water for brood survival. Runoff from high-mountain snowpacks was a month late this year, thus the

threat of nest destruction through flooding was eliminated.

Cold wet weather in late April and early May was detrimental to nesting Canada geese in some localities, but overall success was still good.

Breeding population indexes

The estimated duck breeding pair population for 1967 shows a small increase of 5.1 percent from 1966 and an increase of nearly 30 percent from the average. Paired mallards, on the other hand, were found in fewer numbers this spring. The total number of ducks observed during the 1967 survey shows an increase of 26.6 percent from 1966 and an increase of 28.4 percent from the 1955-1966 average (table B45).

The pattern in goose numbers has been steadily upward since 1957 when aerial surveys revealed the smallest total breeding population since surveys have been made. In 1967 a record number of geese were found and represent a 14 percent increase from 1966 and an increase of 88 percent from the 1952-1966 average.

Production surveys on geese indicated some nest desertion on the Bear River and at Ocean Lake, but production for the most part was good. Flooding was minimal (table B46).

NORTHERN SASKATCHEWAN, NORTHERN MANITOBA, AND NORTHERN ONTARIO

Data supplied by Arthur R. Brazda and
Robert W. Slattery
Bureau of Sport Fisheries and Wildlife

Weather and habitat conditions

One of the latest ice breakups on record delayed the start of the survey to some extent; however, after work was initiated the survey was able to proceed in a relatively orderly manner. For the most part, the extremely high winds that occasionally cause some difficulty were absent during the survey period. From about the middle of May until the end of the first week in June, temperatures were abnormally high

with readings in the 1970's and 1980's. For the remainder of the survey period, temperatures were normal, 35^o to 60^o, but no extended cold periods were experienced.

Habitat conditions throughout the survey area were improved over 1966 because of generally lower water levels. The exception being the important nesting area around Meadow Lake, Saskatchewan, where overall water levels were too low and a considerable number of normally good potholes were completely dry as early as May 26. Low water levels were also encountered in the light soil area north-northwest of Cree Lake but this was not as critical as the Meadow Lake region. Of greater importance to the Meadow Lake area than the dry conditions of 1967, were the host of new drainage ditches observed; this development represents a permanent loss of habitat. New and extensive drainage ditches were also evident in the Saskatchewan River Delta area near The Pas, Manitoba. Water levels were high in northern Ontario with minor river and lake shore flooding. Conditions were good in west-central Ontario. There was almost a complete lack of rainfall over northern Saskatchewan and Ontario since the start of spring. The forest fire hazard was extremely high in both provinces with 138 fires being reported in Ontario on June 4. Moisture conditions improved in Saskatchewan after June 1. The ice went out of the area considerably later than in 1966. Much of the marsh southeast of The Pas, Manitoba, was ice covered on May 24 and Clearwater Lake, at The Pas, was still covered with solid ice on June 1 as was the northern two-thirds of Lake Winnipeg. Ice was also observed on several lakes in Ontario later than at any time during the last 6 years. Lake Athabasca was two-thirds covered and Reindeer Lake and Black Lake (Stony Rapids) were almost solid ice on June 17. In 1966, Reindeer Lake was free of ice on approximately June 11. The vegetative development seemed to follow closely the disappearance of the ice. In the north, much of the willow and birch were still in the budding stage as late as mid-June.

Breeding population indexes

All ducks indicated a 47 percent increase over 1966 and 37 percent over the 10-year average, 1958-67. Dabblers were up 97 percent over 1966 and 88 percent over the average; divers, excluding mergansers and scoters, were up 21 percent and 24 percent respectively. The most remarkable numerical increase was made by the mallard, 173,000 in 1966 compared to 417,000 in 1967. This represents a 141 percent increase over the

previous year and 76 percent over the 10-year average. Early in the survey it appeared that a larger than normal mallard breeding population was going to be found in the "Closed Forest" habitat this year. However, the extent of this increase was not realized until all of the data was analyzed. For the first time in 5 years, the data indicates the mallard to be the number one breeder in this section of Canada. Pintails, however, were down 13 percent from 1966 and 35 percent from the 10-year average. Widgeon and green-winged teal decreased 6 percent and 11 percent respectively from 1966 but were up 15 percent and 42 percent over the 10-year average. In the divers, all species except the ringnecked duck and goldeneye showed significant increases over 1966. Redheads were up 131 percent over 1966 and 88 percent over the 10-year average and scaup 65 percent and 38 percent. Canvasbacks were up 53 percent over 1966, but down 24 percent from the average (tables B47-48).

The 1967 production effort was one of the most successful in several years. The brood index of 228,000 was 128 percent above 1966 and 97 percent higher than the 6-year average. Average duck brood size was 5.4; for geese 3.6. Class II and III broods made up 75 percent of total compared with 80 percent in 1966. The coot brood index was 10,000, the same as 1966.

The late nesting index (LNI) for all dabbling ducks was 95,000, 10 percent higher than the previous year and 6.7 percent higher than the 6-year average. For diver ducks, the LNI was 113,000, 40 percent above 1966 and 3 percent below the average. For all species, including the miscellaneous ducks, the 1967 LNI was 41 percent higher than 1966 and 32 percent above the 1962-67 average (table B49).

SOUTHERN SASKATCHEWAN

Data supplied by Rossalius C. Hanson and
Bonar D. Law, Bureau of Sport Fisheries
and Wildlife

Weather and habitat conditions

May water conditions generally throughout southern Saskatchewan were good. The overall pond index was up 10 percent from last year which also had good water. The index was equal to 1960 and near the 1956 levels. One of the poorer areas was south of a line from Regina to Moosomin. North of this line the potholes were all right except for a dry area north and west from Saskatoon to Lloydminster. The western portions of the Province otherwise were in excellent condition.

Much of the country had sheet water in large quantities, and ponds were deeper than last year. Many of them were two-thirds to three-fourths full but most of the areas appeared to have sufficient water depths to carry them through the breeding season. Many marshes had water above their former shorelines.

The season was at least two weeks behind normal and even behind last year which was a very late year. The first 10 days of May had temperatures as low as 23° to 25° in prairie areas of the Province. This affected the success of the early nesters as it did last year. After the middle of May the weather warmed up and appeared to be ideal from that time on. No unusual weather conditions were noted after May 11 except the lack of rain contributed to a steady drying in the prairies.

The prairies took a turn for the worse after starting out in early May with good to excellent water conditions. Little if any rainfall descended on the area after May 1. The drouth situation was general over most of southern Saskatchewan. The effect was a rapid loss of the temporary and some semipermanent potholes, creating a hazardous situation for bringing the broods to wing. The more permanent areas were holding up well due to their water depth created by the heavy snows of late winter and early spring runoff.

Every stratum showed large declines in numbers of pond areas compared to July 1966, and drastic reductions from May counts of this year. Last year's July pond index was 1,123,200. This year the pond index decreased to 632,200.

The greatest decreases were seen in strata A-East, B-East, and B-West. The areas that looked the saddest were the Coteau hills of A-West, the bulk of A-East stratum from Yorkton on south and the area northwest of Saskatoon. Due to large holdovers of water the western portion of the prairie still looked good. Several fair areas remained on the east side near the Manitoba border north of Yorkton and in the area 50 miles east of Saskatoon (table B50).

Breeding population indexes

The waterfowl population showed only a slight increase over last year which was 57 percent greater than in 1965. Comparisons show all ducks up 14 percent over last year and only 15 percent below the long-term averages, 1955 through 1966. Practically all puddle ducks showed increases over 1966 while divers were generally down or showed no change.

Mallards were up 14 percent over last year while still 32 percent below the average. Pintails and shovelers showed no change from last year while gadwall, widgeon, and teal all increased.

All diving ducks were losers this year when compared to 1966, except redheads and buffleheads which remained the same.

The lone drake index was 83.8 percent. This was well up considering the lateness of the season. This may not be as good an indicator as we would like to believe. If the early nest clutches were much reduced in size due to the inclement weather in early May and late April, this indicator will be misleading (tables B51-53).

Production indexes

Total broods were about the same as in 1966, but still 51 percent below the long-term average. This compares to about the 1960 level of production. However, this is nowhere near the bumper crop of the midfifties. The brood size index stood at 5.5 ducklings per brood which is about average, only slightly under last year. Coot production was up 55 percent over last year but still 63 percent under the long-term average.

This was one of those years when we started out with high expectations and got hit right in the face at the most critical time with a real dry-out. We could have expected, as indicated in the May report, a potential for a real bumper crop if things had been optimum. As it turned out the early

hatch got hit hard by the cold early May and late snows in April. It was not a complete "bust" but certainly was a "fizzle". The renesting attempts did give us a hatch in mid-June, indicated by a sizeable percent of class II broods. The late hatch, noted from early July, came on strong but was met by very unsatisfactory water conditions. All these factors reduced the potential to what might be considered only a mediocre production year.

The Lynch index stood at 105. This is below last year's figure of 112. It is above the 1959-64 average of 73 and slightly above 100, the standard for a satisfactory production year. It comes nowhere near the average of 1952-58 of 198.

Because of the May breeding population size (above early 1960 year's and close to the 1960 index) and water holding in the deeper marshes, there was still a duck crop. However, it is safe to say the fall flight will not exceed 1966 and could be slightly less. The fall flight of mallards will show no improvement over last year. The pintail situation will probably indicate a slight loss because of the poor showing on the first hatch. Other species such as gadwall, shoveler, baldpate, and blue-winged teal will show slight increases over last year. Possibly they will have a moderate increase depending on how fast the remaining water disappears. The diver species will show no gains; most likely a slight decrease because of the lower May population index from last year and poorer water conditions. Coots will be in better shape than last year and could show a moderate increase (table B54).

SOUTHERN MANITOBA

Data supplied by Morton M. Smith and
Richard Droll. Bureau of Sport Fisheries
and Wildlife

Weather and habitat conditions

The summer and fall of 1966 were dry in southern Manitoba. The winter of 1966-67 was colder than normal but not as severe as the winter of 1965-66. Snowfall was above normal with most of it occurring after January 1, 1967.

At the beginning of May nearly all Manitoba stations were reporting moisture surpluses for the growing season. May was very dry, however, in southern Manitoba and at least one station (Rivers) reported the driest May on record. Accumulated growing season precipitation at the end of May was below normal at many stations in southern Manitoba.

Temperatures the first half of May were far below normal all across southern Manitoba. At Winnipeg the mean temperature from May 1-15 was only 36.7°F -- almost 13° below normal. Mean temperatures the last half of May were near normal.

Many potholes were still frozen at the end of the first week of May and on the 9th, two inches of wet snow fell at Brandon. It was after mid-May before the ice went out of Lake Manitoba and heavy snow drifts remained in the trees along the south shore of the lake until at least May 27. On June 2 snow patches were encountered west of Fork River, Manitoba, and the remains of pack-ice in Lake Winnipeg. The occurrence of emergents in ponds and aspen leafing was much delayed in 1967. The "season" was one of the latest ever in southern Manitoba and the phenology seemed about two weeks behind that of an average year.

Habitat conditions varied widely in southern Manitoba in May. A large area south of Newdale was flooded while parts of extreme southwestern Manitoba were very dry. Much of the generally good water conditions of last summer in stratum A had evaporated by the onset of last winter. Burning was widespread during the fall of 1966, and much of the land was fall plowed. There was more burning this spring than in any previous year, and nest losses must have been substantial this May.

Land clearing, spraying of brush and drainage all continue in southern Manitoba. These operations steadily reduce the waterfowl production base of the Province.

Despite the recent dry weather, water conditions were still good to excellent in May. Pond counts were down 3 percent

from those of 1966 but still 29 percent above the average of the last 14 years.

By July ponds counted in stratum A were down 40 percent from 1966. In stratum B, the 1967 pond count was 27 percent lower than that of 1966. The combined counts were one-third lower than the 1966 levels. South of Brandon, brood water was scarce. In the southwestern corner of the Province there was virtually no brood water left. North and west of Brandon, water levels were noticeably lower than they were in 1966 and of course much lower than the early May levels of this year. But, in general, there was adequate brood water available in most of the area north of Brandon. Even stratum B was noticeably drier this July than last and many of the more permanent lakes there had receded and left bare shorelines (table B55).

Breeding population indexes

Waterfowl breeding population indexes (not adjusted for visibility) for the southern Manitoba survey unit were higher than those of 1966 and approached the average level of the past 14 years. But when the aerial index for ducks was adjusted for visibility the 1967 breeding population (1,681,000) was nearly the same as that found in 1966 (1,563,000).

The important dabbling duck index this year was 25 percent higher than that of 1966, but still 14 percent below the 14-year average. Aerial counts showed substantial increases for every dabbling species except the mallard. The 1967 mallard population (not adjusted for visibility) in Manitoba was the same size as that found in 1966, and remains 31 percent below the long-term average. But when these data are corrected for visibility the Manitoba mallard breeding index showed a decline in 1967. However, based on additional unreported transect data from stratum B, the 1967 mallard population in Manitoba was about the same size as that found a year ago.

The blue-winged teal breeding population increased in southern Manitoba in 1967. The unadjusted figures indicate over a 100 percent increase, but the adjusted index only 29 percent above that for 1966. What influence the late survey had on the blue-winged teal count is not known.

The 1967 diving duck index (unadjusted) was nearly the same as that of 1966, and remains 16 percent higher than the long-term average. The index adjusted for visibility indicated a substantial increase in the breeding diving duck

population in Manitoba this year. Both canvasback and redhead show declines based on unadjusted data but gains when these data are adjusted for visibility. Because divers are relatively scarce on the four Manitoba ground-air transects, the uncorrected aerial data provides a better index to population trends for divers in 1967.

Coots numbers were up in Manitoba in 1967 (tables B56-59).

The lone drake index is considered a barometer of the progress and intensity of the nesting effort. Ground studies in stratum A found that nesting activity was generally a week to two weeks late in stratum A (this despite some early mallard and pintail nests). Aerial surveys were necessarily started late and it seems in such years the nesting effort is compressed. At any rate, the lone drake index was 83.4 percent and it appeared the aerial surveys coincided with the peak of nesting for the early species.

Waterfowl production indexes

The 1967 brood index for southern Manitoba was up 5 percent over 1966, and equal to the 13-year average. The coot brood index increased sharply this year and was 46 percent above that of 1966, and 55 percent above the 13-year average (table B60).

The hatch in Manitoba was very late this season, the latest since these records started in 1954 (and probably the latest since 1950). This is now the third year in a row that the Manitoba duck hatch has been considered a late one.

Of the known age broods tallied during the survey, 60 percent were listed as class I and many of these were newly hatched broods. The optimism generated by the good brood count must be tempered by the fact that many of the broods just hatched, and brood water was scarce in portions of southern Manitoba. Without good rains, many of these young broods would be lost in the dry areas. And, there were no effective rains.

The 1967 index to late nesting, which is a measure of "broods to come", was the lowest on record in the survey area. Groups of adult ducks (unsuccessful nesters for the most part) were congregated in lakes and marshes even at the start of the survey on July 10. Such flocks were seen in the very dry southern areas and also in the better watered country from Minnedosa north. It was obvious that these ducks were through trying to produce a brood this season. The late spring plus the rapidly disappearing and lowering water levels no doubt discouraged a good bit of the normal

renewing effort. There was no important late hatch in Manitoba this year.

EASTERN ONTARIO,
QUEBEC AND LABRADOR

Data supplied by E. B. Chamberlain
Bureau of Sport Fisheries and Wildlife
and Marcel Laperle, Canadian
Wildlife Service

Weather and habitat conditions

Flying weather throughout the survey area was better than usual this year, but completion of the survey was delayed by the late breakup in most of the area. On two separate occasions it became necessary to hold up the survey for 3 days in order to let the frozen water areas ahead of us open up.

A few warm days occurred in April, but May and early June were very cold. As a consequence, the vegetative growing season was retarded by at least four weeks over most of eastern Canada. The southern portions of the survey area had a long winter with greater than average snowfall, while the more northerly portions had very low temperatures coupled with much below normal snowfall. As a consequence, water areas in the south had less than average ice thickness while those in the north had much thicker ice cover. For instance, on May 15, ice at Knob Lake was 56 inches thick and Ft. Chimo still had 72 inches. The northern and eastern portions of the survey area were still solidly ice covered on June 10 when the survey ended.

Lack of precipitation in May and June created a serious forest fire hazard throughout eastern Canada, with Ontario having the worst fire situation they have ever recorded. In spite of this, water levels in rivers, ponds and muskeg areas remained high up until mid-June with no evidence of water problems in waterfowl habitat.

Breeding population indexes

Comparison of the data from the first four transects with the figures from 1966 indicated a "pile-up" of waterfowl. However, since the 1966 population index was the lowest ever recorded from this area, the 1967 population index, while considerably higher than the 1966 index, agrees quite well with data from years other than 1966. Among the dabbling ducks, mallards and black ducks increased over 1966 with mallards 22 percent above the long-term average and black ducks about 10 percent below. Diving ducks were up substantially over 1966, with the largest increase in scaup and mergansers. Canada goose data are probably not significant since the principal breeding areas were not reached by this survey. The lone drake index was computed for all species except scaup, scoters and mergansers. This has remained surprisingly stable since 1964 (tables B61-63).

Production survey

This report will cover only the exploratory survey west of James and Hudson Bays.

Four transects totaling 2,088 statute miles (522 square miles) were flown. The survey area followed the west side of James Bay from Moosonee to just north of the Attawapiskat River (about 53° north) thence northwest to Churchill, south to the vicinity of God's Lake, then east to the coast and back south to Moosonee. This area contains 101,320 square miles.

Although this was an exploratory survey a part of the area surveyed had been covered during the past 3 years. Results of these earlier surveys have been reported in Administrative Report No. 105 (Kaczynski and Chamberlain, May 1966). For the 1964 and 1965 surveys, we found 0.80 and 1.17 Canada geese per square mile.

For 1967 we decided to retain the two transects covered in previous years and to extend the coverage to test the theory that areas of goose concentration generally follow areas of ancient marine submergence. To delineate these areas we used the "Glacial Map of Canada" published by the Geological Association of Canada in 1958. With the exception of approximately half of transect W-6 all four of the transects flown this year lie within the area of former marine submergence.

1. Our data show considerably more than the one-duck-per-square-mile considered necessary to justify an aerial survey.
2. There appears to be at least some validity to the theory that goose concentrations are found in areas of former marine submergence.
3. It usually takes more than one survey to determine waterfowl populations in a given area. Therefore, we plan to repeat this survey and extend it if time permits (tables B64-66).

WATERFOWL KILL SURVEY

Data supplied by M. Edwin Rosasco and Elwood M. Martin
Bureau of Sport Fisheries and Wildlife

Scope and methods

Immediately after the hunting season, the Bureau of Sport Fisheries and Wildlife conducts a Mail Questionnaire Survey of United States Waterfowl Hunters. This season marks the 15th consecutive year of the survey since its start in 1952. The results of the latest survey, as summarized in this report, include the following:

1. Estimates, at State and flyway levels, of the relative numbers of duck stamps sold to nonhunters and to potential (intended to hunt), active (hunted at least once), and successful (bagged one or more birds) waterfowl hunters.

2. Estimates, at State and flyway levels, of seasonal average and total numbers of days hunted and ducks and geese bagged, unadjusted for response bias.

3. Estimates, at the flyway level, of total waterfowl bag by species (with species composition based principally on parts collection survey data), adjusted for response bias, and of total crippling loss for ducks, geese, and coots.

4. A comparison of each estimate with that of the previous year.

Preliminary estimates, incorporating Post Office Department reports of duck stamp sales through the third quarter of the fiscal year, were made available for the annual Waterfowl Regulations Meeting in early August (Administrative Report 138). The final estimates, based on total sales for all four quarters, are presented in this report.

This year 2,655 post offices were randomly selected to cooperate in the questionnaire survey, and over 69,800 individuals who purchased their duck stamps at these post offices furnished information about their waterfowl hunting. Last year more than 54,900 persons from 2,898 sample post offices cooperated in the survey. Methods of data collection and analysis remained essentially unchanged this year with sampling, hunter contact, stratification, junior hunter expansion, and bias correction procedures being used which were comparable to those used previously (see Special Scientific Report -- Wildlife No. 99). As usual, hunting activity and harvest estimates have been assigned to the hunter's State of duck stamp purchase, except as otherwise indicated. In

most instances this is also the State in which the hunting occurred but, where this is not true, the indicated distribution of hunting effort among States may be slightly - disproportionate.

Estimates of waterfowl hunting activity and success during the experimental October season in Colorado's San Luis Valley, the September teal season in 20 States in the Mississippi and Central Flyways, and the whistling swan season in Utah are not included in this report. For information on these special seasons refer to Administrative Reports 127 (teal season), 128 (swan season), and 130 (San Luis season). Hunting activity and harvest during the late black duck season in Maine, Massachusetts, and New Hampshire, and the 108-day sea duck season in nine States of the Atlantic Flyway, are included in the estimates presented here.

Data on the species composition of the duck and goose bags were obtained from the Cooperative Waterfowl Parts Collection Survey, a collection of duck wings and goose tails by mail from a sample of waterfowl hunters. These wings and tails indicate to trained biologists the species, age, and sex composition of the ducks and geese bagged in each State. Species composition figures for the States having late black duck or extended sea duck seasons were refined by incorporating additional information obtained from the questionnaire surveys. For more detailed species composition data at the State level, see Administrative Reports 133 (ducks) and 136 (geese). Additional information is presented in Administrative Reports 134 (sex ratios) and 135 (age ratios).

Pacific Flyway

An estimated 3,508,000 ducks were bagged in the Pacific Flyway during the 1966 waterfowl season, an increase of 20 percent from the 1965 season (table C-1). An additional 645,000 ducks were knocked down but not retrieved, for a total kill (bag plus cripples) of approximately 4,153,000 ducks. Duck bag data are presented at the State level in table C-3. Analysis of the Flyway duck bag by species shows that five species made up 87 percent of this total. These were the mallard (34 percent), pintail (21 percent), American widgeon (13 percent), green-winged teal (12 percent), and shoveler (7 percent). About two-thirds of the duck species show bag increases over the previous year (table C-1). The canvasback bag increased 319 percent making the Pacific Flyway the most important harvest area for this species in 1966.

Removal of the special bag and possession limit restrictions on the canvasback last season contributed greatly to this tremendous increase in kill.

The Flyway goose bag (443,400 birds) increased 97 percent from the previous season. Based on hunter reports, an additional 73,600 geese were knocked down but not retrieved, for a total kill of 517,000 geese (table C-2). Goose bag data are reported by State in table C-3.

An estimated 167,600 coots were bagged in the Flyway, an increase of 56 percent from the preceding year, while an additional 88,200 coots were knocked down but not retrieved, yielding a total kill of 255,700 coots.

As shown in table C-4, 375,800 potential adult hunters, 10 percent more than in the previous season, purchased duck stamps in the Pacific Flyway. Of these, 82 percent hunted waterfowl and, of those who hunted, 85 percent were successful. These percentages change little from year to year. A total of 2,435,400 hunter-days afield (including junior hunter-days) was estimated for the Flyway, an increase of 17 percent from the year before (table C-3).

Central Flyway

Reports indicate that 1,931,600 ducks were bagged in the Central Flyway, an increase of 79 percent from 1965 (table C-5). An additional 475,200 ducks were knocked down but not retrieved, for a total kill of 2,406,800 ducks. All States, except New Mexico, registered increases in total duck bag from the previous season (table C-7). Over 75 percent of the Flyway duck bag was composed of mallard (36 percent), green-winged teal (12 percent), gadwall (11 percent), pintail (9 percent), and American widgeon (8 percent).

The Flyway retrieved kill of 419,400 geese represents an increase of 104 percent from the 1965 season. In addition, 70,500 geese were knocked down but not retrieved, for a total kill of 489,900 geese (table C-6). Goose bag estimates by State are given in table C-7.

An estimated 41,900 coots were retrieved in the Flyway, an increase of 5 percent over the previous season. Hunter reports indicate that 26,600 coots were knocked down but not retrieved, so the total kill was about 68,500 coots.

The number of potential adult hunters in the Central Flyway in 1966 (307,700) was 19 percent higher than in 1965 (table C-8). Of this number, 84 percent were active and 84 percent of these active hunters were successful. A total of 2,128,800 hunter-days was estimated for the Flyway, an increase of 52 percent from the year before (table C-7).

Mississippi Flyway

Approximately 4,797,300 ducks were bagged in the Mississippi Flyway in 1966, 45 percent more than during the previous season (table C-9). An additional 1,149,000 ducks were knocked down but not retrieved, for a total kill of 5,946,300 ducks. Duck bag figures are presented by State in table C-11. Those species making up 5 percent or more of the Flyway duck bag, namely, the mallard (35 percent), wood duck (10 percent), green-winged teal (8 percent), American widgeon (7 percent), ring-necked duck (6 percent), gadwall (6 percent), lesser scaup (6 percent), blue-winged teal (5 percent), and pintail (5 percent), constituted 87 percent of the total. The bags of most species of ducks increased substantially (table C-9).

The Flyway goose bag (349,700 birds) was 38 percent above that of the previous season. An additional 53,800 geese were knocked down but not retrieved, for a total kill of 403,600 geese (table C-10). Goose figures are presented by State in table C-11.

An estimated 629,400 coots were bagged in the Flyway, an increase of 63 percent from 1965. An additional 177,700 coots were knocked down but not retrieved, so the total kill was approximately 807,000 coots.

As shown in table C-12, 750,300 potential adult hunters, 20 percent more than in 1965, were recorded for the Mississippi Flyway. Of these, 88 percent were active and, of those who hunted, 83 percent were successful. A total of 4,923,600 hunter-days was estimated for the Flyway, 24 percent above the 1965 season total (table C-11).

Atlantic Flyway

Approximately 1,423,600 ducks were bagged in the Atlantic Flyway this season, an increase of 40 percent over last season (table C-13). Reports indicate that 342,700 ducks were knocked down but not retrieved, yielding a total kill estimate of 1,766,300 ducks. Duck bag figures are presented by State in table C-15. The bags of seven species -- the black duck (20 percent), mallard (15 percent), wood duck (13 percent), ring-necked duck (7 percent), green-winged teal (6 percent), lesser scaup (6 percent), and American widgeon (5 percent) -- accounted for 72 percent of the retrieved duck kill in the Flyway. The canvasback bag increased 124 percent and the lesser scaup bag increased 217 percent (table C-13).

The 1966 Flyway goose bag (181,000 birds) was 87 percent higher than that of the previous season. An estimated 27,100 geese were knocked down but not retrieved, for a total kill

of 208,000 geese (table C-14). Goose bag data at the State level appear in table C-15.

An estimated 110,700 coots were retrieved in the Flyway, an increase of 29 percent from the previous year, while 35,800 coots were knocked down but not retrieved, for a total kill of about 146,400 coots.

An increase of 11 percent in the number of potential adult waterfowl hunters was registered for the Atlantic Flyway, as 330,300 purchased duck stamps this year. Of the potential hunters, 82 percent went hunting and 77 percent of these active hunters were successful (table C-16). A total of 1,811,100 hunter-days was estimated for the Flyway, 18 percent more than during the previous season (table C-15).

Alaska

An estimated 52,000 ducks were bagged in Alaska during the 1966 season, a decrease of 14 percent from the preceding year. In addition, 9,700 ducks were knocked down but not retrieved, for a total kill of approximately 61,700 ducks (table C-17). Examination of the duck bag by species reveals that nearly 86 percent of the total retrieved kill was composed of 5 species including the mallard (25 percent), pintail (21 percent), green-winged teal (18 percent), American widgeon (16 percent), and goldeneye (5 percent).

The Alaska goose bag (7,400 birds) dropped 5 percent from its 1965 level. The unretrieved kill is judged to have been 1,100, so the total kill was approximately 8,500 geese (table C-17).

A total of 10,470 potential adult hunters, 12 percent more than in the previous season, bought duck stamps in Alaska in 1966 (table C-4). Of this total, 64 percent were active and, of these active hunters, 85 percent were successful. The number of hunter-days decreased by 15 percent to 36,600 in 1966 (table C-17).

In regard to the crippling loss of ducks in the United States, there is close agreement between hunter reports and hunter performance observations (Administrative Report 132). In 1965, the Hunter Performance Survey indicated that 20 percent of all ducks shot (bag plus cripples) were lost, compared to 19 percent reported on the questionnaire. In 1966, hunter performance studies indicated an unretrieved kill of 17 percent, while the mail questionnaire survey figure was 18 percent.

APPENDIX

A. WATERFOWL WINTER SURVEY TABLES

TABLE A-1.--Survey of waterfowl on their winter habitat, January 1967

[nearest hundreds]

Species	Pacific Flyway ^{1/}	Central Flyway ^{2/}	Mississippi Flyway	Atlantic Flyway	Total
Ducks:					
Dabblers:					
Mallard	1,809,200	2,076,100	3,728,900	169,800	7,784,000
Black duck	--	--	207,300	287,200	494,500
Mottled duck	--	4,700	88,200	1,900	94,800
Gadwall	34,700	102,300	977,200	23,800	1,138,000
American widgeon	588,000	145,300	636,300	123,400	1,493,000
Green-winged teal	344,000	178,800	700,600	74,100	1,297,500
Blue-winged and cinnamon teal	7,400	64,200	187,100	12,600	271,300
Shoveler	263,700	35,000	313,800	27,100	639,600
Pintail	2,545,900	635,300	1,093,700	171,000	4,445,900
Tree duck	--	12,600	--	--	12,600
Subtotal	5,592,900	3,254,300	7,933,100	890,900	17,671,200
Divers:					
Redhead	34,300	683,400	33,500	209,100	960,300
Canvasback	78,400	13,400	44,400	226,200	362,400
Scaup	106,700	44,200	289,700	570,200	1,010,800
Ring-necked duck	4,600	13,000	134,300	77,400	229,300
Goldeneye	45,700	5,100	27,600	86,600	165,000
Bufflehead	36,300	2,800	3,500	57,700	100,300
Ruddy duck	102,000	53,800	39,100	--	194,900
Subtotal	408,000	815,700	572,100	1,227,200	3,023,000
Miscellaneous:					
Eider and scoter	187,600	--	--	323,600	511,200
Oldsquaw	200	--	2,800	17,300	20,300
Merganser	29,600	87,500	68,000	56,900	242,000
Subtotal	217,400	87,500	70,800	397,800	773,500
Unidentified	117,600	14,700	65,700	57,900	255,900
Total ducks	6,335,900	4,172,200	8,641,700	2,573,800	21,723,600

See footnotes p. 45

TABLE A-1.--Survey of waterfowl on their winter habitat, North America,
January 1967--continued

Species	Pacific Flyway	Central Flyway	Mississippi Flyway	Atlantic Flyway	Total
Geese:					
Snow goose ³	746,700	172,400	78,700	59,900	1,057,700
Blue goose	--	108,300	301,400	1,000	410,700
White-fronted goose	185,600	21,300	46,000	--	252,900
Canada goose	219,600	230,300	481,700	604,000	1,535,600
Cackling goose	124,000	--	--	--	124,000
Total geese	1,275,900	532,300	907,800	664,900	3,380,900
Brant	179,700	--	--	219,200	398,900
Swans:					
Whistling swan	48,900	--	300	72,300	121,500
Trumpeter swan	700	--	--	--	700
Total swans	49,600	--	300	72,300	122,200
Coots	762,300	669,300	1,064,600	389,300	2,885,500
Grand total	8,603,400	5,373,800	10,614,400	3,919,500	38,511,100

¹ Includes west coast of Mexico.

² Includes east coast and central highlands of Mexico.

³ Includes Ross' goose.

TABLE A-2.--Distribution of wintering waterfowl, North America, 1967--
continued

[nearest hundreds]

State	Ducks	Geese	Brant	Swans	Coots	Total
Mississippi Flyway:						
Minnesota	16,200	8,900	--	--	--	25,100
Wisconsin	44,600	2,900	--	--	100	47,600
Michigan	31,700	8,900	--	300	--	40,900
Iowa	123,300	100	--	--	--	123,400
Missouri	508,600	164,900	--	--	4,300	677,800
Illinois	501,800	180,300	--	--	--	682,100
Indiana	72,000	7,500	--	--	900	80,400
Ohio	148,000	15,600	--	--	300	163,900
Arkansas	1,631,400	11,000	--	--	50,600	1,693,000
Mississippi	281,700	600	--	--	12,900	295,200
Louisiana	4,494,300	378,100	--	--	945,300	5,817,700
Alabama	112,000	41,800	--	--	29,300	183,100
Kentucky	8,800	12,500	--	--	500	21,800
Tennessee	638,900	74,800	--	--	20,400	734,100
Flyway total	8,613,300	907,900	--	300	1,064,600	10,586,100
Atlantic Flyway:						
Maine	67,800	500	--	--	--	68,300
New Hampshire	2,600	2,600	--	--	--	5,200
Vermont	3,600	--	--	--	--	3,600
Massachusetts	208,800	11,700	100	--	--	220,600
Connecticut	55,200	600	--	--	--	55,800
Rhode Island	18,000	200	--	--	--	18,200
New York	219,300	2,700	23,300	--	1,500	246,800
New Jersey	295,500	6,100	189,100	--	400	491,100
Pennsylvania	12,700	6,800	--	--	--	19,500
Delaware	56,200	83,700	2,400	100	900	143,300
Maryland	508,300	360,700	100	52,200	12,800	934,100
Virginia	101,300	52,700	4,200	1,200	100	159,500
West Virginia	5,700	--	--	--	200	5,900
North Carolina	203,000	103,700	--	18,800	121,400	446,900
South Carolina	413,000	26,000	--	--	48,900	487,900
Georgia	61,700	500	--	--	6,400	68,600
Florida	423,300	6,400	--	--	196,700	626,400
Flyway total	2,656,000	664,900	219,200	72,300	389,300	4,001,700

TABLE A-2.--Distribution of wintering waterfowl, North America, 1967

[nearest hundreds]

State	Ducks	Geese	Brant	Swans	Coots	Total
Pacific Flyway:						
Washington	1,130,300	101,700	21,200	800	43,000	1,297,000
Oregon	252,800	47,900	1,500	5,900	44,800	352,900
Idaho	667,200	16,300	--	500	38,300	722,300
Nevada	99,700	14,200	--	5,200	21,600	140,700
California	3,637,000	1,086,300	3,800	35,900	570,900	5,333,900
Utah	16,600	1,000	--	900	1,500	20,000
Arizona	23,400	3,800	--	--	12,300	39,500
Montana	100,500	3,300	--	400	9,500	113,700
Wyoming	1,700	100	--	--	--	1,800
Colorado	9,700	100	--	--	--	9,800
New Mexico	12,600	--	--	--	--	12,600
Mexico (west coast)	374,400	1,200	153,200	--	--	528,800
Flyway total	6,325,900	1,275,900	179,700	49,600	741,900	8,573,000
Central Flyway:						
Colorado	288,700	49,500	--	--	--	338,200
Nebraska	245,700	9,200	--	--	--	254,900
Kansas	665,500	13,600	--	--	--	679,100
Oklahoma	274,100	19,900	--	--	3,000	297,000
New Mexico	163,600	17,000	--	--	4,700	185,300
Texas	1,713,100	372,700	--	--	270,800	2,356,600
Montana	74,100	1,400	--	--	--	75,500
Wyoming	36,400	900	--	--	--	37,300
North Dakota	3,300	--	--	--	--	3,300
South Dakota	367,500	17,600	--	--	--	385,100
Mexico (east coast and central)	169,600	10,800	--	--	259,800	440,200
Flyway total	4,001,600	512,600	--	--	538,300	5,052,500

B. WATERFOWL BREEDING GROUND SURVEY TABLES

TABLE B-1.--Ten-year trend in waterfowl breeding population indexes by species, Alaska, 1958-1967

[index numbers in thousands]

Species	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	Average
Ducks:											
Dabblers:											
Mallard	63	98	78	108	60	83	67	27	32	42	66
American widgeon	53	32	26	42	42	27	36	40	32	59	39
Green-winged teal	7	2	1	4	2	2	10	14	17	24	8
Shoveler	10	8	7	17	7	5	7	4	5	6	8
Pintail	273	474	356	440	476	378	379	240	250	247	351
Subtotal	406	614	468	611	587	495	499	325	336	378	472
Divers:											
Canvasback	3	12	19	6	7	17	11	21	17	15	13
Scaup	588	533	597	657	657	585	562	355	425	314	527
Goldeneye	6	8	27	26	33	10	9	9	13	38	18
Bufflehead	19	18	24	31	39	37	32	29	22	30	28
Subtotal	616	571	667	720	736	649	614	414	477	397	586
Miscellaneous:											
Scoter	324	183	324	316	225	165	148	190	252	250	238
Eider	24	17	17	30	11	11	20	27	14	16	19
Oldsquaw	108	59	90	87	69	94	92	49	79	87	81
Subtotal	456	259	431	433	305	270	260	266	345	353	338
Total ducks	1,478	1,444	1,566	1,764	1,628	1,414	1,373	1,005	1,158	1,128	1,396

TABLE B-2.--Comparative status of waterfowl breeding population indexes by species and stratum, Alaska, 1966-1967

[index numbers in thousands]

Species	Stratum		Total		Average	Percent change from--	
	37	38	1966	1967	1958-67	1966	Average
Ducks:							
Dabblers:							
Mallard	11	31	32	42	66	+ 31	- 36
American widgeon	18	41	32	59	39	+ 84	+ 51
Green-winged teal	5	19	17	24	8	+ 41	+200
Shoveler	2	4	5	6	8	+ 20	- 25
Pintail	118	129	250	247	351	- 1	- 30
Subtotal	154	224	336	378	472	+ 13	- 20
Divers:							
Canvasback	--	15	17	15	13	- 12	+ 15
Scaup	164	150	425	314	527	- 26	- 40
Goldeneye	24	14	13	38	18	+192	+111
Bufflehead	--	30	22	30	28	+ 36	+ 7
Subtotal	188	209	477	397	586	- 17	- 32
Miscellaneous:							
Scoter	152	98	252	250	238	- 1	+ 5
Eider	16	--	14	16	19	+ 14	- 16
Oldsquaw	83	4	79	87	81	+ 10	+ 7
Subtotal	251	102	345	353	338	+ 2	+ 4
Total ducks	593	535	1,158	1,128	1,396	- 3	- 19

TABLE B-3.--Ten-year trend in waterfowl breeding population index by species, Old Crow Flats,
Yukon, 1957-67

[index numbers in thousands]

Species	1957	1958	1960	1961	1962	1963	1964	1965	1966	1967
Ducks:										
Dabblers:										
Mallard	--	1	2	4	4	2	--	1	1	3
American widgeon	3	4	9	9	6	7	4	5	9	15
Green-winged teal	--	1	1	2	1	--	1	--	--	Tr.
Shoveler	--	1	1	--	--	--	--	--	--	--
Pintail	15	16	37	16	6	10	6	4	2	9
Subtotal	18	23	50	31	17	19	11	10	12	27
Divers:										
Canvasback	2	6	6	1	--	1	--	2	16	8
Scaup	13	24	38	49	35	24	24	21	49	38
Goldeneye	2	2	2	2	2	3	--	1	--	4
Bufflehead	--	--	--	--	--	--	--	--	1	Tr.
Subtotal	17	32	46	52	37	28	24	24	66	50
Miscellaneous:										
Scoter	26	31	68	74	52	32	20	17	43	39
Eider	--	--	--	--	--	--	--	--	--	--
Oldsquaw	3	6	6	7	11	4	7	3	8	10
Subtotal	29	37	74	81	63	36	27	20	51	49
Total ducks	64	92	170	164	117	83	62	54	129	126

Note: 1959 missing

TABLE B-4.--Comparative status of waterfowl breeding population indexes by species, Old Crow Flats, Yukon, 1966-1967

[index numbers in thousands]

Species	Stratum	Total		Average	Percent change	
	05	1966	1967	1957-67	1966	from-- Average
Ducks:						
Dabblers:						
Mallard	3	1	3	2	+200	+ 50
American widgeon	15	9	15	7	+ 67	+114
Green-winged teal	Trace	--	--	1	--	--
Shoveler	--	--	--	--	--	--
Pintail	9	2	9	12	+350	- 25
Subtotal	27	12	27	22	+125	+ 23
Divers:						
Canvasback	8	16	8	4	- 50	+100
Scaup	38	49	38	32	- 22	+ 19
Goldeneye	4	--	4	2	--	+100
Bufflehead	Trace	1	--	Trace	--	--
Subtotal	50	66	50	38	- 23	+ 34
Miscellaneous:						
Scoter	39	43	39	40	- 9	- 2
Cldsquaw	10	8	10	7	+ 25	+ 43
Subtotal	49	51	49	47	- 6	+ 4
Total ducks	126	129	126	107	- 1	+ 21

Note: 1959 data missing.

TABLE B-5.--Whistling swan breeding population indexes, Alaska, 1958-1967

[index numbers in thousands]

	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967
Sq. mi. sampled	640	644	604	648	492	468	414	208	212	210
Number counted	600	546	710	759	470	567	481	298	256	208
Population index	64	59	79	79	56	64	50	62	52	43

TABLE B-6.--Comparative brood counts from two study areas, Alaska, 1967

Species	Tetlin							Yukon Flats							
	Number of broods							Number of broods							Percent change from-- 1966
	1961	1962	1963	1964	1965	1966	1967	1963	1964	1965	1966	1967			
Mallard	34	14	23	2	3	9	13		8	3	9	6	11	+ 83	
Widgeon	74	18	23	6	7	36	28	+ 44	41	14	39	49	62	+ 27	
Green-winged teal	42	30	27	19	16	66	101	+ 53	16	7	18	52	47	- 10	
Shoveler	2	1	--	--	--	--	1	--	10	3	8	11	13	+ 18	
Pintail	19	18	11	4	3	8	21	+159	30	9	16	19	44	+132	
Canvasback	14	18	14	2	3	6	9	+ 50	8	1	13	15	16	+ 7	
L. Scaup ¹	14	2	11	2	--	10	14	+ 40	9	--	12	49	61	+ 25	
Total	199	101	109	35	32	135	187	+ 38	122	37	115	201	254	+ 26	

¹ Scaup hatch not complete at time of surveys.

TABLE B-7.--Ten-year trend in waterfowl breeding population indexes by species, northern Alberta, northeastern British Columbia, and Northwest Territories, 1958 to 1967

[index numbers in thousands]

Species	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967
Ducks:										
Dabblers:										
Mallard	518	923	321	795	446	430	477	239	329	297
Gadwall	1	1	1	2	4	1	3	10	2	3
American widgeon	148	332	297	277	142	132	203	154	174	90
Green-winged teal	98	241	128	137	52	110	149	88	129	87
Blue-winged teal	21	54	50	51	24	16	47	22	12	1
Shoveler	66	169	71	128	25	29	151	56	66	55
Pintail	306	928	253	473	171	154	182	159	110	61
Subtotal	1,158	2,648	1,121	1,863	864	872	1,212	728	822	594
Divers:										
Redhead	7	34	21	19	31	12	29	5	7	13
Canvasback	44	40	50	18	13	49	38	20	44	9
Scaup	1,100	1,831	1,326	1,495	1,279	1,383	1,348	1,306	1,603	1,712
Ring-necked duck	32	92	59	27	32	38	45	59	60	56
Goldeneye	90	173	40	99	66	13	48	37	15	18
Bufflehead	79	138	119	93	141	80	118	123	150	119
Ruddy duck	5	13	9	6	1	7	6	3	5	5
Subtotal	1,357	2,321	1,624	1,757	1,563	1,582	1,632	1,553	1,884	1,932
Miscellaneous:										
Scoter	700	1,149	1,223	968	548	544	858	638	524	599
Oldsquaw	207	285	188	212	145	81	282	158	293	221
Merganser	121	82	111	113	45	81	69	81	72	46
Subtotal	1,028	1,516	1,522	1,293	738	706	1,209	877	889	866
Total Ducks	3,543	6,485	4,267	4,913	3,165	3,160	4,053	3,158	3,595	3,392

TABLE B-7.--Ten-year trend in waterfowl breeding population indexes by species, northern Alberta,
northeastern British Columbia, and Northwest Territories, 1958 to 1967--continued

[index numbers in thousands]

Species	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967
Geese:										
White-fronted goose	1	10	7	9	6	1	3	4	2	1
Canada goose	48	90	45	30	18	55	17	14	27	11
Swans	13	45	24	30	27	32	19	20	16	18
Coots	--	--	7	16	7	9	7	--	11	Tr.

TABLE B-8.--Waterfowl breeding population index, in northern Alberta, northeastern British Columbia, and Northwest Territories
1966 vs. 1967
[in thousands]

Species	Stratum and index										Total		Percent change from--	
	14	15	06	07	08	09	10	11	12	12	1967	1966	1966	Average
Ducks:														
Dabblers:														
Mallard	98.4	17.4	46.7	41.4	61.2	8.4	17.1	6.6	--	--	297.2	282.3	+ 5	- 38
Gadwall	1.4	0.2	1.6	--	--	--	--	--	--	--	3.2	0.7	+357	N.C.
Widgeon	23.2	3.9	5.5	17.1	7.4	1.5	22.6	7.5	1.0	1.0	89.7	163.7	- 45	- 54
Green-winged teal	45.7	0.6	7.1	3.6	19.5	0.6	6.1	1.6	2.0	2.0	86.8	121.1	- 29	- 30
Blue-winged teal	--	1.3	--	--	--	--	--	--	--	--	1.3	5.3	- 75	- 97
Shoveler	16.2	1.1	1.6	--	35.6	--	--	--	--	--	54.5	62.1	- 12	+ 72
Pintail	18.3	4.7	8.7	--	7.4	1.5	5.5	4.9	9.9	9.9	60.9	102.0	- 40	- 78
Subtotal	203.2	29.2	71.2	62.1	131.1	12.0	51.3	20.6	12.9	12.9	593.6	737.2	- 19	- 50
Divers:														
Redhead	4.9	5.6	--	--	2.0	--	--	--	--	--	12.5	2.8	+346	- 28
Canvasback	--	6.2	--	--	--	0.6	--	1.9	--	--	8.7	35.9	- 76	- 73
Scaup	192.6	20.0	405.0	248.6	69.9	156.9	553.6	47.4	18.0	18.0	1,712.0	1,551.5	+ 11	+ 19
Ring-necked duck	19.7	2.0	11.9	3.6	7.4	2.7	3.4	1.6	3.5	3.5	55.8	57.4	- 3	+ 12
Goldeneye	--	5.9	3.2	3.6	5.4	--	--	--	--	--	18.1	13.2	+ 37	- 70
Bufflehead	52.7	9.1	24.5	2.1	28.9	1.5	--	--	--	--	118.8	130.2	- 9	+ 3
Ruddy duck	4.9	0.1	--	--	--	--	--	--	--	--	5.0	3.1	+ 62	- 17
Subtotal	274.8	48.9	444.6	257.9	113.6	161.7	557.0	50.9	21.5	21.5	1,930.9	1,794.1	+ 8	+ 12
Miscellaneous:														
Scoter and elder	52.7	6.2	173.3	72.1	7.4	27.9	203.7	18.1	37.2	37.2	598.6	514.9	+ 16	- 23

TABLE B-8.--Waterfowl breeding population index, in northern Alberta, northeastern British Columbia, and Northwest Territories

1966 vs. 1967 -- continued

/in thousands/

Species	Stratum and index										Percent change from--	
	14	15	06	07	08	09	10	11	12	Total 1967	1966	1966 Average
Ducks:												
Miscellaneous:												
Oldsquaw	14.8	--	7.1	101.4	--	--	76.6	3.0	18.0	220.9	293.0	- 25 + 7
Merganser	1.4	1.3	26.1	5.0	--	--	9.9	1.9	--	45.6	51.0	- 11 - 44
Subtotal	68.9	7.5	206.5	178.5	7.4	27.9	290.2	23.0	55.2	865.1	858.9	+ 1 - 19
Total ducks	546.9	85.6	722.3	498.5	252.1	201.6	898.5	94.5	89.6	3,389.6	3,390.2	- - 15
Geese:												
White-fronted goose	--	--	--	--	--	--	--	--	1.3	1.3	1.9	- 32 - 75
Canada goose	2.8	--	4.3	2.1	--	--	0.4	--	--	10.7	26.5	- 60 - 69
Swans	--	--	--	--	--	--	7.6	2.2	8.3	18.1	15.8	+ 15 - 25
Coots	--	0.3	--	--	--	--	--	--	--	0.3	7.8	- 96 -100

TABLE B-9.--Long-term trend in pond indexes by strata with comparisons
to average and previous year, central and southern
Alberta, May and July, 1967

[index numbers in thousands]

May:	Stratum			Total
	26	27	28	
1958	284	430	99	813
1959	146	253	99	498
1960	287	549	159	995
1961	213	432	56	701
1962	132	345	49	526
1963	189	601	59	849
1964	153	366	113	632
1965	299	637	103	1,039
1966	282	490	72	844
1967	260	361	140	761
Average 1952-66	292	501	97	890
Percent change from 1966	- 7.8	-26.3	+94.4	- 9.8
Percent change from average	-11.0	-27.9	+44.3	-14.5
July:				
1958	152	282	43	477
1959	104	147	60	311
1960	93	262	47	402
1961	56	153	30	239
1962	72	257	39	368
1963	162	471	60	693
1964	87	162	59	308
1965	260	485	111	856
1966	187	234	66	487
1967	182	280	92	554
Average 1956-66	138	287	55	480
Percent change from 1966	- 2.7	+19.6	+39.4	+13.8
Percent change from average	+31.9	- 2.4	+67.3	+15.4

TABLE B-10. --Ten-year trend in waterfowl breeding population indexes by species,
central and southern Alberta, 1958-1967

[index numbers in thousands]

Species	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967
Ducks:										
Dabblers:										
Mallard	1,210	1,307	1,005	860	729	745	836	339	567	628
Gadwall	82	129	142	110	89	86	101	60	110	152
American widgeon	183	257	227	189	127	134	213	56	128	171
Green-winged teal	35	71	56	65	14	15	24	14	32	43
Blue-winged teal	179	194	169	172	60	61	114	80	115	161
Shoveler	223	206	244	171	124	192	210	98	173	215
Pintail	662	565	632	290	233	353	274	343	429	607
Subtotal	2,574	2,729	2,475	1,857	1,376	1,586	1,772	990	1,554	1,977
Divers:										
Redhead	65	68	40	40	21	38	44	30	47	60
Canvasback	94	68	40	38	49	49	56	40	29	40
Scaup	313	332	252	248	214	263	259	134	180	188
Ring-necked duck	1	4	2	2	1	Trace	Trace	3	2	12
Goldeneye	3	3	3	3	2	1	1	Trace	1	--
Bufflehead	21	26	21	31	12	14	15	10	14	19
Ruddy duck	16	32	31	19	19	10	17	8	18	26
Subtotal	513	533	389	381	318	375	392	225	291	345
Miscellaneous:										
Scoter	32	56	35	43	48	17	32	20	24	21
Merganser	--	--	--	--	--	--	--	3	3	1
Total ducks	3,119	3,318	2,899	2,281	1,742	1,978	2,196	1,238	1,872	2,344

TABLE B-10.--Ten-year trend in waterfowl breeding population indexes by species,
central and southern Alberta, 1958-1967--continued

[index numbers in thousands]

Species	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967
Geese:										
Canada goose	--	--	--	--	--	2	5	4	4	7
Coots	75	125	85	97	22	62	89	48	49	119
Grand total	3,194	3,443	2,984	2,378	1,764	2,042	2,290	1,290	1,925	2,470

Note: Canada geese not included before 1963 and mergansers not included before 1965.

TABLE B-11.--Comparative status of waterfowl breeding population indexes
by species and stratum, southern Alberta, 1967

[index numbers in thousands]

Species	Stratum			Total		Average	Percent change from--	
	26	27	28	1966	1967	1952-66	1966	Average
Ducks:								
Dabblers:								
Mallard	180	316	132	567	628	863	+ 10.8	- 27.2
Gadwall	57	73	22	110	152	86	+ 38.2	+ 76.7
American widgeon	70	72	29	128	171	167	+ 33.6	+ 2.4
Green-winged teal	10	29	4	32	43	37	+ 34.4	+ 16.2
Blue-winged teal	62	77	22	115	161	132	+ 40.0	+ 22.0
Shoveler	112	66	37	173	215	174	+ 24.3	+ 23.6
Pintail	302	104	201	429	607	554	+ 41.5	+ 9.6
Subtotal	793	737	447	1,554	1,977	2,004	+ 27.2	- 1.3
Divers:								
Redhead	15	37	8	47	60	46	+ 27.6	+ 30.4
Canvasback	5	35	Tr.	29	40	52	+ 37.9	- 23.1
Scaup	32	133	23	180	188	236	+ 4.4	- 20.3
Ring-necked duck	4	7	1	2	12	2	+500.0	+500.0
Goldeneye	--	--	--	1	--	3	-100.0	-100.0
Bufflehead	2	16	1	14	19	17	+ 35.7	+ 11.8
Ruddy duck	7	13	6	18	26	18	+ 44.4	+ 44.4
Subtotal	65	241	39	291	345	364	+ 18.6	- 5.2
Miscellaneous:								
Scoter	1	20	--	24	21	34	- 12.5	- 38.2
Merganser	1	--	--	3	1	3	- 66.7	- 66.7
Total ducks	860	998	486	1,872	2,344	2,393	+ 25.2	- 2.0
Geese:								
Canada goose	5	Tr.	2	4	7	4	+ 75.0	+ 75.0
Coots	47	35	37	49	119	82	+142.8	+ 45.1
Grand total	912	1033	525	1,925	2,470	2,471	+ 28.3	N. C.

TABLE B-12.--Lone drake index: Long-term trend expressed as a percentage of total ducks, southern Alberta, 1958-1967

Year	Mallard	Pintail	Canvasback	Total
1958	85.80	84.34	75.47	85.00
1959	70.66	73.26	42.84	71.00
1960	84.92	82.02	72.04	84.00
1961	77.10	74.22	63.89	76.00
1962	82.39	83.98	54.32	82.00
1963	84.99	85.25	80.08	84.86
1964	85.28	88.14	52.65	84.57
1965	82.07	75.17	65.02	77.85
1966	80.97	74.99	56.09	77.94
1967	83.60	64.14	70.60	79.63

TABLE B-13.--Waterfowl brood and late nesting indexes by stratum
compared to previous year and long-term average, central and
southern Alberta, 1967

[index numbers in thousands]

Species	Stratum			Total		Average	Percent change from--	
	26	27	28	1966	1967	1956-66	1966	Average
Broods:								
Duck brood index	53	89	23	172	165	220	- 4.1	- 25.0
Average brood size ¹	6.3	5.6	5.9	6.6	5.9	5.9	- 10.6	N.C.
Coot brood index	8	16	1	35	25	44	- 28.6	- 43.2
Late-nesting index: ²								
Dabblers:								
Mallard	5	5	5	15	15	6		
Gadwall	3	3	1	7	7	3		
American widgeon	2	Tr.	Tr.	2	2	1		
Green-winged teal	1	5	--	2	6	Tr.		
Blue-winged teal	--	2	1	5	3	2		
Shoveler	4	3	Tr.	5	7	2		
Pintail	3	3	2	12	9	2		
Subtotal	18	21	9	48	49	16	N.C.	+200.0
Divers:								
Redhead	1	Tr.	Tr.	1	1	1		
Canvasback	--	--	--	1	--	Tr.		
Scaup	3	4	1	10	8	7		
Ring-necked duck	--	--	Tr.	--	Tr.	Tr.		
Goldeneye	--	--	--	Tr.	--	Tr.		
Bufflehead	--	--	--	--	--	Tr.		
Ruddy duck	Tr.	1	1	7	2	3		
Subtotal	4	5	2	19	11	11	- 42.1	N.C.
Grand total	22	26	11	67	60	27	- 11.9	+118.5

¹Class II and III broods only.

²As indicated by adult pairs and singles.

TABLE B-14.--Duck and coot breeding population indexes by species and region, Washington 1967

Species	Region				Total		Percent change
	W. Washington	Potholes	Irrigation	Highlands & misc.	1966	1967	
Ducks:							
Dabblers:							
Mallard	10,500	14,530	12,730	16,140	60,710	53,900	- 11
Gadwall	--	4,350	1,150	--	4,310	5,500	+ 28
Widgeon	20	8,510	620	2,830	9,720	11,980	+ 23
Green-winged teal	480	360	830	320	1,910	1,990	+ 4
Blue-winged/ cinnamon teal	830	5,950	6,830	3,640	24,790	17,250	- 30
Shoveler	30	2,690	610	780	3,440	4,110	+ 15
Pintail	--	1,330	--	110	3,070	1,440	- 53
Wood duck	2,790	--	710	530	7,250	4,030	- 44
Subtotal	14,650	37,720	23,480	24,350	115,200	100,200	- 13
Divers:							
Redhead	--	5,780	1,730	400	9,440	7,910	- 16
Canvasback	--	--	--	--	10	--	--
Scaup	--	6,310	780	2,240	6,260	9,330	+ 49
Ring-necked duck	--	560	--	4,200	3,300	4,760	+ 44
Bufflehead	--	--	--	50	50	50	- 17
Goldeneye	--	200	--	3,250	3,100	3,450	+ 11
Ruddy duck	--	530	1,930	470	6,440	2,930	- 55
Subtotal	--	13,380	4,440	10,610	28,610	28,430	- 1

TABLE B-14.--Duck and coot breeding population indexes by species and region, Washington 1967

Species	Region				Total		Percent change
	W. Washington	Potholes	Irrigation	Highlands & misc.	1966	1967	
Ducks:							
Miscellaneous:							
American merganser	30	--	--	240	390	270	- 31
Hooded merganser	1,500	--	--	--	1,700	1,500	- 12
Subtotal	1,530	--	--	240	2,090	1,770	- 15
<hr/>							
Total ducks	16,180	51,100	27,920	35,200	145,900	130,400	- 11
Coots	580	5,770	14,740	1,790	19,110	12,880	- 33
Grand total	16,760	56,870	42,660	36,990	165,010	143,280	- 13

TABLE B-15.--Waterfowl production index, Washington, 1966 and 1967

Species	1966	1967	Percent change
Ducks:			
Dabblers:			
Mallard	143,700	147,100	+ 2
Gadwall	13,400	16,500	+23
American widgeon	29,900	31,500	+ 5
Green-winged teal	5,300	4,700	-11
Blue-winged/ cinnamon teal	63,700	39,100	-39
Shoveler	10,500	11,200	+ 7
Pintail	10,100	3,900	-61
Wood duck	19,200	10,800	-44
Subtotal	295,800	264,800	-10
Divers:			
Redhead	31,200	23,200	-26
Canvasback	Trace	--	--
Scaup	14,700	19,700	+34
Ring-necked duck	9,300	8,500	- 9
Goldeneye	8,700	8,800	+ 1
Bufflehead	100	100	N.C.
Ruddy duck	18,000	10,800	-40
Subtotal	82,000	71,100	-13
Miscellaneous:			
American merganser	1,200	700	-42
Hooded merganser	3,200	1,900	-41
Subtotal	4,400	2,600	-41
Total ducks	382,200	338,500	-11
Geese:			
Canada goose	11,800	11,300	- 4
Coots	52,100	31,500	-40

TABLE B-16.--Goose production index, Oregon, 1966 and 1967

Transect	Total broods		Total young	
	1966	1967	1966	1967
Klamath River	252	250	1,137	1,132
Spring Lake	5	5	24	24
Nuss Lake	14	22	65	97
Agency Lake	57	70	255	323
Wocus Bay	42	13	189	58
Howard Bay	29	18	122	79
Summer Lake	34	21	136	93
N. Lake County	58	50	252	211
S. Lake County	22	27	101	109
Wickiup Reservoir	--	10	--	38
G. I. Ranch	16	12	68	56
Jefferson County	4	2	17	9
Ladd Marsh	5	5	29	20
Columbia River	5	11	30	49
Hanks Marsh	5	24	20	108
Klamath Forest Refuge	33	67	150	300
Malheur Refuge	400	444	1,800	2,000
Total	981	1,051	4,395	4,706

TABLE B-17.--Duck production index by species, Oregon, 1966 and 1967

Species	Number of broods		Number of young	
	1966	1967	1966	1967
Ducks:				
Dabblers:				
Mallard	129	162	900	1,140
Gadwall	36	63	254	488
Widgeon	3	12	24	82
Blue-winged/ cinnamon teal	67	73	451	535
Green-winged teal	2	10	12	58
Shoveler	1	5	7	41
Pintail	7	14	46	98
Wood duck	13	19	84	102
Subtotal	258	358	1,778	2,544
Divers:				
Redhead	157	44	952	274
Canvasback	13	3	58	20
Goldeneye	--	1	--	9
Bufflehead	1	2	6	16
Ruddy duck	33	12	173	60
Subtotal	204	62	1,189	379
Miscellaneous:				
Hooded merganser	2	4	11	24
Unidentified	13	1	76	2
Total	477	425	3,054	2,949

TABLE B-18.--Nesting pair index, California, 1966 and 1967

Species	Sacramento Valley		Suisun Marsh		North San Joaquin Valley		South San Joaquin Valley		North-eastern California		Klamath Basin		Total	
	1966	1967	1966	1967	1966	1967	1966	1967	1966	1967	1966	1967	1966	1967
Ducks:														
Dabblers:														
Mallard	33,840	27,880	1,120	1,250	1,940	1,090	1,300	710	5,520	3,280	4,460	410	148,180	34,620
Gadwall	160	800	1,280	280	670	500	30	20	890	720	1,940	460	3,970	2,780
Blue-winged/														
cinn. teal	1,160	1,200	160	110	740	460	110	170	1,010	890	410	360	3,590	3,190
Shoveler	--	320	60	--	120	100	10	--	170	210	550	60	910	690
Pintail	200	480	70	50	80	100	30	60	1,790	1,260	240	1,160	2,410	3,110
Subtotal	35,360	30,680	2,690	1,690	3,550	2,250	1,480	960	9,380	6,360	7,600	2,450	59,060	44,390
Divers:														
Redhead	120	--	--	10	50	10	--	10	410	570	1,640	350	2,220	950
Scaup	--	--	--	--	--	--	--	--	150	170	620	170	770	340
Ruddy duck	120	40	--	70	100	150	10	60	110	160	1,000	1,180	1,340	1,660
Subtotal	240	40	--	80	150	160	10	70	670	900	3,260	1,700	4,330	2,950
Miscellaneous	30	80	--	--	--	--	--	--	80	150	150	120	310	350
Total ducks	35,680	30,800	2,690	1,770	3,700	2,410	1,490	1,030	10,130	7,410	11,010	4,270	63,700	47,690
Canada goose	--	--	--	--	--	--	--	--	790	1,310	790	620	1,580	1,930
Coots	17,560	22,800	620	640	1,870	2,990	730	1,740	1,270	1,430	2,750	1,710	24,800	31,310

TABLE B-19.--Fall population index, California, 1966 and 1967

	Sacramento Valley		Suisun Marsh		North San Joaquin Valley		South San Joaquin Valley		North-eastern California		Klamath Basin		Total	
	1966	1967	1966	1967	1966	1967	1966	1967	1966	1967	1966	1967	1966	1967
Ducks:														
Dabblers:														
Mallard	141,330	116,430	4,610	5,190	6,290	3,530	3,570	1,970	35,880	21,310	32,670	2,720	224,350	151,150
Gadwall	800	4,000	1,400	1,410	2,100	1,570	70	40	6,910	5,680	13,830	3,640	25,110	16,340
Blue-winged/														
cinn. teal	4,310	4,570	600	390	2,330	1,460	310	460	6,530	5,290	3,400	1,650	17,480	13,820
Shoveler	--	1,430	240	--	350	320	30	--	1,020	1,280	4,060	540	5,700	3,570
Pintail	770	1,850	260	210	220	310	60	180	10,270	7,240	1,620	7,520	13,200	17,310
Subtotal	147,210	128,280	7,111	7,200	11,290	7,190	4,040	2,650	60,610	40,800	55,580	16,070	285,840	202,190
Divers:														
Redhead	540	--	--	60	150	30	--	20	2,820	3,930	11,400	2,540	14,910	6,580
Scaup	--	--	--	--	--	--	--	--	930	1,040	4,370	1,220	5,300	2,260
Ruddy duck	540	180	--	300	270	410	30	160	630	910	6,130	9,920	7,600	11,880
Subtotal	1,080	180	--	360	420	440	30	180	4,380	5,880	21,900	13,680	27,810	20,720
Miscellaneous	510	360	--	--	--	--	--	--	400	730	930	770	1,840	1,860
Total ducks	148,800	128,820	7,110	7,560	11,710	7,630	4,070	2,830	65,390	47,410	78,410	30,520	315,490	224,770
Canada goose¹	--	--	--	--	--	--	--	--	17,830	15,600	5,570	4,310	23,400	19,910
Coots	77,880	105,050	2,820	3,340	10,180	16,330	3,970	9,500	7,600	8,590	19,210	11,100	121,660	153,910

¹Includes nonbreeding component.

TABLE B-20. --Duck numbers, aerial survey, Utah, 1966 and 1967

	Route flown					
	Box Elder County	Weber County	Davis County	Jordan River	Salt Lake County	Utah County
Area sampled (sq. mi.)	48.0	15.5	14.2	6.2	6.7	18.0
						108.6
Ducks:						
Number counted:						
1967	2,843	994	1,004	643	104	603
1966	2,797	616	774	173	24	430
						6,191
						4,814
Number per square mile:						
1967	59.2	64.1	70.7	103.7	15.5	33.5
1966	58.3	39.7	54.5	27.9	3.6	23.9
						57.0
						23.9

TABLE B-21. --Species composition of breeding populations of waterfowl, Utah, 1966 and 1967

Species	Northern area		Southern area	
	1967	1966	1967	1966
Ducks:				
Dabblers:				
Mallard	12.3	15.0	15.2	17.2
Gadwall	13.0	13.1	14.5	4.4
Widgeon	1.0	1.4	1.7	1.0
Green-winged teal	1.3	1.6	3.6	6.4
Blue-winged teal	1.7	1.4	1.4	0.5
Cinnamon teal	17.4	17.9	13.8	17.1
Shoveler	6.9	6.4	6.8	9.4
Pintail	7.7	10.4	10.2	18.3
Divers:				
Redhead	27.3	22.9	19.8	12.0
Canvasback	--	--	0.1	--
Scaup	--	0.4	1.5	1.5
Bufflehead	--	--	0.5	--
Goldeneye	--	--	--	--
Ruddy duck	11.4	9.5	10.9	4.4

TABLE B-22. --Canada geese production index, Utah, 1966 and 1967

Area	Number of breeding pairs		Number of young	
	1967	1966	1967	1966
Cutler Reservoir	25	20	106	103
Public shooting grounds	7	11	32	53
Bear River Refuge and vicinity	201	404	1,024	1,939
Ogden Bay Wildlife Management Area	85	94	373	497
Farmington Bay Wildlife Management Area	78	76	360	378
Scipio Reservoir	2	5	12	22
Remond Lake	10	12	57	57
Gunnison Reservoir	4	9	19	51
Clear Lake Wildlife Management Area	7	7	31	28
Mona Reservoir	7	9	26	38
Wales Reservoir	9	28	44	132
Rich County (Bear River)	83	87	444	410
Total	518	762	2,528	3,708

TABLE B-23.--Dike line breeding pair counts of waterfowl
on four State refuges, Utah, 1966 and 1967

Species	1966	1967
Ducks:		
Dabblers:		
Mallard	744	603
Gadwall	774	750
American widgeon	12	17
Green-winged teal	53	21
Blue-winged teal	38	28
Cinnamon teal	897	901
Shoveler	396	277
Pintail	545	414
Subtotal	897	3,011
Divers:		
Redhead	1,073	1,198
Canvasback	--	2
Scaup	3	10
Goldeneye	--	--
Bufflehead	--	1
Ruddy duck	201	381
Subtotal	1,277	1,592
Total ducks	2,174	4,603
Canada goose	188	177

TABLE B-24.--Aerial counts, Canada goose breeding pairs and grouped birds, Idaho, 1966 and 1967

Areas	1966	1967
Snake River drainage:		
Farewell Bend to Walter's Ferry	1,270	1,771
Payette River (mouth to Emmett)	516	866
Strike Dam to American Falls Dam	225	246
North Fork, including Island Park	330	344
South Fork	251	217
Mud Lake - Camas NWR	171	180
Gray's Lake	538	696
Blackfoot Reservoir	377	554
Subtotal	3,678	4,874
Bear River Drainage:		
Dingle Marsh	1,758	1,528
Total	5,436	6,402

TABLE B-25.--Canada goose production index, Idaho, 1966 and 1967

Area	Number goslings		Percent change from 1966
	1966	1967	
Southwestern Idaho:			
Homedale	968	951	- 2
Payette River	507	513	+ 1
Southeastern Idaho:			
Blackfoot Reservoir	374	275	- 26
Island Park Reservoir	117	88	- 25
North Fork Snake River	140	79	- 44
North Lake	40	83	+108
Total	2,146	1,989	- 7

TABLE B-27.--Water index by stratum, Montana, 1965 to 1967

[in thousands]

Year	Stratum 40			Stratum 41			Total
	Stock Dam	Pot- hole	Stream	Stock Dam	Pot- hole	Stream	
May:							
1965	46.9	16.8	47.4	23.1	54.3	36.1	224.6
1966	33.9	3.8	59.9	30.0	33.6	46.0	207.2
1967	25.3	5.2	45.0	19.0	41.7	31.6	167.8
July:							
1966	19.9	1.4	41.7	14.8	10.3	37.6	125.7
1967	26.5	3.5	37.4	15.9	12.5	28.1	123.9

TABLE B-28.--Lone drake index, Montana, 1965, 1966, and 1967

[expressed as percentage of total drakes]

Year	Mallard	Pintail	Total birds
1965	69.7	76.1	72.3
1966	79.1	85.9	81.2
1967	78.6	87.2	62.3
1967 stratum 40	69.3	58.3	46.7
1967 stratum 41	81.6	88.2	64.2

TABLE B-26.--Water index, Montana, 1965, 1966, and 1967

[index number in thousands]

Water type	Stratum 40			Stratum 41			Total		Percent change from -- 1966
	1965	1966	1967	1965	1966	1967	1965	1966	
	1967	1966	1965	1967	1966	1965	1967	1966	
Stock dam and dugout:									
Permanent	34.1	22.5	14.4	16.5	20.3	12.7	50.6	42.8	27.1
Semipermanent	7.8	6.6	9.0	2.4	6.3	4.5	10.6	12.9	13.5
Temporary	5.0	4.8	1.9	4.2	3.4	1.8	9.2	8.2	3.7
Subtotal	46.9	33.9	25.3	23.1	30.0	19.0	70.4	63.9	44.3
Pothole and lake:									
Permanent	5.0	1.4	1.0	37.1	11.6	12.5	42.1	13.0	13.5
Semipermanent	3.8	.7	3.3	5.5	10.0	14.1	9.3	10.7	17.4
Temporary	8.0	1.7	1.0	11.7	12.0	14.1	19.7	13.7	15.1
Subtotal	16.8	3.8	5.3	54.3	33.6	40.7	71.1	37.4	46.0
Stream:									
Permanent	22.8	15.0	10.2	14.4	12.7	11.0	37.2	27.7	21.2
Semipermanent	13.3	23.5	12.3	7.4	17.0	9.0	20.7	40.5	21.3
Temporary	11.3	21.4	22.0	14.3	16.3	11.6	25.6	37.7	33.6
Subtotal	47.4	59.9	44.5	36.1	46.0	31.6	83.5	105.9	76.1
Total									
	111.1	97.6	75.1	113.5	109.6	91.3	225.0	207.2	166.4
									- 20

TABLE B-29.--Waterfowl brood and late-nesting index by stratum,
Montana, 1967

[in thousands]

Species	Stratum		Total 1966	Total 1967	Percent change from-- 1966
	40	41			
Broods:					
Duck brood index	13.3	31.7	66.0	45.0	- 32
Average brood size	4.2	5.2	5.3	4.9	- 8
Late nesting index:					
Dabblers:					
Mallard	2.6	2.8	3.2	5.4	+ 69
Gadwall	.2	1.9	2.0	2.1	+ 5
Widgeon	.7	1.4	2.4	2.1	- 13
Green-winged teal	--	.4	0.2	.4	+100
Blue-winged teal	.2	.8	0.4	1.0	+150
Shoveler	.7	.3	0.6	1.0	+ 67
Pintail	--	.3	0.8	.3	- 62
Subtotal	4.4	7.9	9.6	12.3	+ 28
Divers:					
Ring-necked duck	--	.3	--	.3	
Ruddy duck	--	.6	--	.6	
Subtotal	--	.9	--	.9	
Total	4.4	8.8	9.6	13.2	

TABLE B-30.--Waterfowl breeding population by area and year, Chippewa National Forest, Minnesota, 1966 and 1967

Area	1967	1966	Percent change
			from-- 1966
Bowstring	138	178	- 22
Burns	114	93	+ 22
Kitchie	163	160	NC
Lower Pigeon	6	33	- 82
Mud Lake ¹	--	170	--
Raven Lake	8	--	--
Round Lake	511	283	+ 80
Third River	142	201	- 29
Lake Winnibigoshish	220	210	+ 5
Rabideau	181	211	+ 14
Total	1,483	1,539	- 4

¹ Not censused in 1967.

TABLE B-31.--Ratio by species for all ducks, adult-juvenile, Chippewa National Forest, Minnesota, 1966 and 1967

Species	1967			1966		
	Adult	Juveniles	Ratio	Adult	Juveniles	Ratio
Mallard	220	518	1:2.3	223	342	1:1.5
Widgeon	85	169	1:2.0	75	223	1:2.9
Goldeneye	51	184	1:3.6	91	170	1:1.8
Blue-winged teal	8	11	1:1.4	15	19	1:1.2
Ring-necked duck	17	38	1:2.2	34	30	1:0.8
Wood duck	56	107	1:1.9	101	142	1:1.4
Other	12	7	1:0.6	29	45	1:1.5

TABLE B-32. --Long-term trend in pond indexes by strata and comparisons to average and previous year, (Strata 30 and 33), North Dakota and South Dakota, May and July 1959

/index numbers in thousands/

Year	Strata 30 and 33
May:	
1959	209
1960	397
1961	105
1962	348
1963	413
1964	207
1965	338
1966	475
1967	523
Average 1959 - 1966	311
Percent change 1967 from average	+68.2
Percent change 1967 from 1966	+10.1
July:	
1959	110
1960	311
1961	108
1962	231
1963	275
1964	211
1965	245
1966	471
1967	328
Average 1959 - 1966	245
Percent change 1967 from average	+33.9
Percent change 1967 from 1966	-30.3

TABLE B-33. --Eight-year trend in waterfowl breeding population indexes by species, strata 30 and 33 in North Dakota and South Dakota, 1960 to 1967¹

/Index numbers in thousands/

Species	1960	1961	1962	1963	1964	1965	1966	1967
Ducks:								
Dabblers:								
Mallard	123	108	174	247	163	171	160	206.1
Gadwall	30	20	62	113	38	89	119	153.4
American widgeon	7	7	3	2	2	--	4	3.4
Green-winged teal	--	2	3	1	--	--	9	2.3
Blue-winged teal	88	55	97	166	224	171	101	121.4
Shoveler	72	37	107	93	41	65	52	70.7
Pintail	171	83	182	115	60	35	82	122.2
Subtotal	491	312	628	737	528	531	527	679.5
Divers:								
Redhead	18	7	22	30	23	30	35	24.4
Canvasback	9	5	3	13	16	11	26	16.2
Scaup	22	8	22	19	2	20	17	13.0
Ring-necked duck	Tr.	-	--	1	--	--	2	-
Ruddy duck	13	3	6	7	2	3	7	8.2
Subtotal	62	23	53	70	43	64	87	61.8
Total Ducks	553	335	681	807	571	595	614	741.3
Geese:								
Canada goose	--	--	--	--	--	--	--	.2
Coots:								
American Coot	48	29	56	62	31	72	94	84.6
Grand Total	601	364	737	869	602	667	708	826.1

¹ North Dakota and South Dakota survey sampling increased in 1967. Strata 30 and 33 (old North Dakota Central and South Dakota Central) are only ones that can be compared directly to past years data.

TABLE B-34.--Waterfowl breeding population indexes by species and stratum with comparison in strata 30 and 33 (Central), North and South Dakota, 1967 +

[index numbers in thousands]

Species	Stratum 2			Total all strata 1967	Total strata 30 and 33		Average 30 and 33 1960-1966	Strata 30 and 33 percent change from --		
	29 and 32	30 and 33	31 and 34		1967	1966		1966	average	
Ducks:										
Dabblers:										
Mallard	58.3	206.1	165.1	429.5	206.1	160	164	+ 28.8	+ 25.7	
Gadwall	33.7	153.4	20.6	207.7	153.4	119	67	+ 28.9	+ 129.0	
American widgeon	.8	3.4	29.8	34.0	3.4	4	4	- 15.0	- 15.0	
Green-winged teal	--	2.3	11.2	13.5	2.3	9	2	- 74.4	+ 15.0	
Blue-winged teal	35.3	121.4	34.9	191.6	121.4	101	129	+ 20.2	- 5.9	
Shoveler	17.1	70.7	28.9	116.7	70.7	52	67	+ 36.0	+ 5.5	
Pintail	33.8	122.2	77.0	233.0	122.2	82	104	+ 49.0	+ 17.5	
Subtotal	179.0	679.5	367.5	1,226.0	679.5	527	537	+ 28.9	+ 26.5	
Divers:										
Redhead	5.7	24.4	--	30.1	24.4	35	24	- 30.3	+ 1.7	
Canvasback	2.2	16.2	--	18.4	16.2	26	12	- 37.7	+ 35.0	
Scaup	2.5	13.0	1.8	17.3	13.0	17	16	- 23.5	- 18.8	
Ring-necked duck	--	--	.6	.6	--	2	--	--	--	
Bufflehead	--	--	.6	.6	--	--	--	--	--	
Ruddy duck	1.0	8.2	--	9.2	8.2	7	6	+ 17.1	+ 36.7	
Subtotal	11.4	61.8	3.0	76.2	61.8	87	58	- 29.0	+ 6.6	
Total Ducks	190.4	741.3	370.5	1,302.2	741.3	614	595	+ 20.7	+ 24.6	
Geese:										
Canada goose	--	.2	--	.2	.2	--	--	--	--	

Footnotes p.

TABLE B-34.--Waterfowl breeding population indexes by species and stratum with comparison in strata 30 and 33 (Central), North and South Dakota, 1967 1 --continued

(index numbers in thousands)

Species	Stratum		Total all strata 1967	Total strata 30 and 33		Average 30 and 33 1960-1966	Strata 30 and 33 percent change from --		
	29 and 32	30 and 33		31 and 34	1967		1966	1966	average
Coot	19.2	84.6	107.6	3.8	84.6	94	56	- 10.0	+ 51.1
Grand Total	209.6	826.1	1,410.0	374.3	826.1	708	651	+ 16.7	+ 26.9

¹Because of sampling revisions initiated in the tri-State surveys in May 1967, comparisons with 1966 and the average are calculated only for strata 30 and 33. The data here is directly comparable to past years and these strata hold more than 50% of the observed waterfowl.

229 and 32 - East
30 and 33 - Central
31 and 34 - West

TABLE B-35.--Lone drake index

Long-term trend expressed as percentage of total drakes,
North Dakota and South Dakota, 1959 to 1967

[Mallards, Pintails, Canvasbacks]

Year	Percent of total drakes
1959	45.5
1960	73.3
1961	67.1
1962	73.9
1963	77.7
1964	67.6
1965	66.6
1966	69.6
1967	78.4

TABLE B-36.--Breeding population index adjusted for visibility, North Dakota and South Dakota, 1967
[index numbers in thousands]

Species	Strata 29 and 32			Stratum 30			Strata 31 and 34			Stratum 33			Adjusted totals
	Air	Visibility rate	Adjusted index	Air	Visibility rate	Adjusted index	Air	Visibility rate	Adjusted index	Air	Visibility rate	Adjusted index	
Mallard	58.3	.8125	71.7	162.3	.4510	359.9	165.1	1.119	147.5	43.8	.4827	90.7	669.8
Pintail	33.8	.2500	135.2	94.3	.2424	389.0	77.0	.410	187.8	27.9	.2942	109.7	821.7
Blue-winged teal	35.3	.2312	152.7	97.0	.1888	513.8	34.9	.198	176.3	24.4	.0665	366.9	1,209.7
Other ducks	63.0	.7583	83.1	243.4	.4510	539.7	93.5	.4337	215.6	48.2	.3237	148.9	987.3
Total ducks	190.4	.4301	442.7	597.0	.3312	1,802.4	370.5	.5095	727.2	144.3	.2015	716.2	3,688.5
Ponds	216.1	.5895	366.6	390.7	.7540	518.2	162.7	1.000	162.7	132.3	.8074	163.8	1,211.3

TABLE B-37.--Waterfowl brood and late-nesting indexes by stratum compared to 1966 and long-term averages, North Dakota and South Dakota, 1967

[index numbers in thousands]

	Stratum				Total all strata 1967	Total stratum 30 and 33 1966 - 1967	Long- term average	Percent change from--	
	29 and 32	30 and 33	31 and 34	1966				Average	
Broods:									
Duck brood index	8.6	43.5	22.9		75.0	44.3	38.2	- 1.8	+ 13.9
Average brood size	5.4	5.5	4.2		15.1	6.7	6.1	- 17.9	- 9.8
Coot brood index	2.8	15.3	.8		18.9	17.2	6.5	- 11.0	+135.4
Late-nesting index:									
Dabblers:									
Mallard	6.2	25.6	7.6		39.4	14.2	25.6	+ 80.3	+ 43.8
Gadwall	4.9	22.9	.4		28.2	6.3	22.9	+263.5	+ 80.3
American widgeon	--	.6	3.0		3.6	--	.4	--	+ 50.0
Green-winged teal	--	.8	.8		1.6	.3	.3	+166.7	+166.7
Blue-winged teal	3.8	17.4	1.7		22.9	5.2	17.4	+234.6	+ 32.8
Shoveler	--	.8	.4		1.2	2.2	1.0	- 63.6	- 20.0
Pintail	.3	2.4	5.6		8.3	1.6	1.1	+ 50.0	+118.2
Subtotal	15.2	70.5	19.5		105.2	29.8	46.4	+136.6	+ 51.9
Divers:									
Redhead	--	1.3	--		1.3	.8	1.4	+ 62.5	- 7.1
Canvasback	--	.4	--		.4	--	.2	--	+100.0
Scaup	.5	.4	--		.9	.3	.1	+ 33.3	+300.0
Ruddy	1.9	6.1	.4		8.4	6.8	6.9	- 10.3	- 11.6
Subtotal	2.4	8.2	.4		11.0	7.9	8.6	+ 3.8	= 4.6
Miscellaneous ducks	--	--	--		--	--	--	--	--
Grand Total	17.6	78.7	19.9		116.2	37.7	55.0	+108.7	+ 40.0

TABLE B-38.--Waterfowl breeding population indexes by species and stratum, Minnesota, 1967

Species	Stratum						State total
	42	43	44	45	46	47	
Ducks:							
Dabblers:							
Mallard	--	1,100	4,000	29,400	32,900	1,500	68,900
Black duck	--	--	--	--	--	--	--
Gadwall	--	400	200	2,700	200	--	3,500
American widgeon	--	--	--	1,000	1,000	--	2,000
Green-winged teal	--	--	--	400	--	--	400
Blue-winged teal	400	400	4,800	12,200	21,200	--	42,000
Shoveler	--	400	1,900	2,600	2,300	--	7,200
Pintail	--	300	200	2,300	400	--	3,200
Wood duck	--	--	1,400	400	3,900	--	5,700
Subtotal	400	2,600	12,500	51,000	64,900	1,500	132,900
Divers:							
Redhead	--	--	--	3,100	400	--	3,500
Canvasback	--	--	--	2,300	--	--	2,300
Scaup	--	--	--	--	--	--	--
Ring-necked duck	--	--	--	1,700	6,800	--	8,500
Goldeneye	--	--	--	--	5,100	--	5,100
Bufflehead	--	--	--	--	--	--	--
Ruddy duck	--	--	--	600	200	--	800
Subtotal	--	--	--	7,700	12,500	--	20,200
Miscellaneous:							
Merganser	--	--	--	--	500	--	500
Subtotal	--	--	--	--	500	--	500
Total ducks							
	400	2,600	12,500	58,700	77,900	1,500	153,600

TABLE B-38.--Waterfowl breeding population indexes by species and stratum, Minnesota, 1967--
continued

Species	Stratum					State total
	42	43	44	45	46	47
Geese:						
Canada goose	--	--	--	--	--	--
Coots	--	--	2,300	4,900	9,800	17,000
Total ducks	400	2,600	14,800	63,600	87,700	170,600

TABLE B-39.--Aerial duck index adjusted for visibility, Minnesota, 1967

[illegible]

TABLE B-40.--July waterfowl population summary, Minnesota, 1967

	Stratum					State total
	42	43	44	45	46	47
Area in square miles	864	5,328	5,580	16,596	24,076.8	2,210.4
Linear miles in sample				1,710		72
Square miles in sample				213.75		9.0
Expansion factor				77.64		245.6
<hr/>						
Broods:						
Broods seen				38		--
Brood indexes				2,950		--
Broods per square mile				.18		--
<hr/>						
Late nesters:						
Late nesters seen				117		--
Late nesting index				9,084		--
Late nesters per square mile				.55		--
<hr/>						
Coots:						
Coot broods seen				9		--
Coot brood index				699		--
Coot broods per square mile				.04		--
<hr/>						
Ponds:						
Ponds seen (doubled)				3,018		13
Pond index (use May factor)				117,159		3,200
Ponds per square mile				7.06		1.44

TABLE B-41.--Statewide aerial breeding population index, Nebraska
1966 and 1967

Species	1966	1967
Ducks:		
Dabblers:		
Mallard	29,674	27,615
Gadwall	23,009	13,553
Widgeon	181	679
Green-winged teal	820	170
Blue-winged teal	31,542	22,721
Shoveler	12,134	17,124
Pintail	8,575	6,277
Subtotal	105,935	88,139
Divers:		
Redhead	2,495	679
Canvasback	400	764
Scaup	4,372	2,971
Ruddy duck	898	3,650
Subtotal	8,165	8,064
Total	114,100	96,203

TABLE B-42.--Duck breeding ground population estimates, Colorado
1966 and 1967

Area	Total estimated breeding pairs			Percent change from	
	1967	1966	13-year Ave. 1954-1966	1966	13-year average
San Luis Valley	32,774	26,835 ¹	27,442 ²	+ 22.1	+ 19.5
North Park	13,722	11,622	5,607	+ 18.1	+144.7
South Platte Valley	8,813	6,701	4,847	+ 31.5	+ 81.8
Cache la Poudre Valley	5,735	2,762	1,903	+107.6	+201.4
Yampa Valley	3,246	2,105	2,890	+ 54.2	+ 12.3
Browns Park	441	392	132	+ 12.5	+234.1
Total	64,731	50,417	42,821	+ 28.4	+ 51.2

- 1 This figure includes mallards only on the Monte Vista National Wildlife Refuge. Data on other species not compiled at report date.
- 2 San Luis Valley averages are based on results of 1964, 1965, and 1966 coverage only. The much less intensive coverage of previous years is not included in the calculations.

TABLE B-43.--Species composition of breeding ducks population, Colorado
1966 and 1967

Species	Number			Percent		
	1966	1967	1954-1966 ¹ average	1966	1967	1954-1966 ¹ average
Ducks:						
Dabblers:						
Mallard	28,913	37,652	27,581	57.35	58.17	62.64
Gadwall	4,863	6,167	3,669	9.65	9.53	8.33
American widgeon	164	1,035	528	0.32	1.60	1.20
Green-winged teal	745	4,057	1,135	1.48	6.27	2.58
Blue-winged/or cinnamon teal	3,440	6,354	3,896	6.82	9.82	8.85
Shoveler	3,609	2,194	1,617	7.16	3.39	3.67
Pintail	3,018	4,186	2,887	5.99	6.47	6.56
Divers:						
Redhead	4,050	1,368	1,668	8.03	2.11	3.79
Canvasback	--	6	25	--	--	0.06
Scaup	943	948	564	1.87	1.46	1.28
Ring-necked duck	40	59	70	0.08	0.09	0.16
Bufflehead	--	--	5	--	--	0.01
Ruddy duck	240	394	107	0.47	0.61	0.24
Miscellaneous:						
Merganser	392	311	279	0.78	0.48	0.63
Total	50,417	64,731	44,031	100.00	100.00	100.00

1 San Luis Valley averages, included here, are for the years 1964, 1965, and 1966 only.

TABLE B-44.--Number of Canada geese by breeding classification,
Moffat County, Colorado, 1967

Area	Nesting pairs	2-year ¹ old pairs	Estimated ² number goslings	Number birds in groups	Total birds
Yampa					
Craig to Juniper Springs	15	29	88	88	220
Juniper to Cross Mountain	8	7	43	99	157
Lily Park	14	17	76	51	158
Subtotal	37	53	207	238	535
Green (Brown's Park)	10	2	49	66	127
Little Snake (lower bridge to State line)	20	9	107	112	248
Grand total	67	64	363	416	910

1 Novice pairs which are potential nesters next year.

2 This category includes both eggs and goslings counted.

TABLE B-45.--Summary of duck breeding ground survey, Wyoming, 1964 to 1967

Species	Total ducks				Percent change from--	
	1964	1965	1966	1967	1966	average
Ducks:						
Dabblers:						
Mallard	142,198	168,041	117,274	120,139	+ 2.4	+ 10.7
Gadwall	27,685	23,597	12,184	33,510	+175	+167.3
Widgeon	13,486	29,135	11,276	11,205	- 0.7	+ 13.7
Teal	35,258	39,638	23,928	41,968	+ 75.4	+104.1
Shoveler	28,708	10,708	7,872	16,068	+104.1	+ 56.4
Pintail	48,555	23,091	13,616	17,810	+ 30.8	- 31.4
Divers:						
Redhead	--	2,470	424	531	+ 25.2	- 61.5
Canvasback	1,550	510	1,276	531	- 58.4	- 33.8
Scaup	--	3,272	5,052	2,271	- 55	+ 53.9
Goldeneye	1,550	163	1,596	953	- 30.3	+ 69.3
Bufflehead	--	163	320	--	--	--
Ruddy duck	--	490	108	1,746	+870.0	+ 21.5
Miscellaneous:						
Mergansers	1,210	9,281	9,306	7,031	- 24.4	+ 46.7
Coots	1,504	6,083	6,434	5,759	- 10.5	+ 26.7
Total	301,704	316,642	210,666	259,522	+ 23.2	

TABLE B-46.--Summary of Canada goose breeding pair surveys, Wyoming, 1952-1967

Drainage	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961
Snake River ¹	334	506	267	437	347	350	452	382 ²	326	208
Bear River	361	369	183	270	264	299	469	387	408	336
Green River	360	336	204	119	160	162	225	235	297	364
North Platte River	--	509	296	219	147	81	194	232	193	240
Wind River	--	13	103	97	88	90	90	132	176	224
Big Horn River	--	--	--	--	--	--	--	--	--	--
Total	1,055	1,733	1,053	1,142	1,006	982	1,430	1,368	1,400	1,372

¹Years 1952-1957 represent counts on the Snake River Drainage above confluence of Snake River and Hoback River. Years 1958-1966 include all of Snake River Drainage in Wyoming.

²Unable to fly Snake River in 1959. Figure is average of years 1952-1958.

³Represents an estimate.

TABLE B-46--Summary of Canada goose breeding pair surveys, Wyoming, 1952-1967--continued

Drainage	1962	1963	1964	1965	1966	1967	Percent change from-- 1966	Percent change from-- 1952-1966 average
Snake River ¹	270	441	379	493	553	503	- 9	+ 31
Bear River	498	757	747	898	961	1,008	+ 5	+110
Green River	310	478	432	428	440	455	+ 3	+ 50
North Platte River	241	312	348	360	310	410	+ 32	+ 56
Wind River	173	182	199	228	266	446	+ 68	+203
Big Horn River	--	25	40 ³	44	41	106	+159	+179
Total	1,492	2,195	2,145	2,451	2,571	2,928	+ 14	+ 88

¹ Years 1952-1957 represent counts on the Snake River Drainage above confluence of Snake River and Hoback River. Years 1958-1966 include all of Snake River Drainage in Wyoming.

² Unable to fly Snake River in 1959. Figure is average of years 1952-1958.

³ Represents an estimate.

TABLE B-47.--Ten-year trend in waterfowl breeding population indexes by species
northern Saskatchewan, northern Manitoba, and northern Ontario, 1958 to 1967

/ index numbers in thousands/

Species	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967
Ducks:										
Dabblers:										
Mallard	263	227	252	220	267	178	192	183	173	417
Black duck	6	16	10	30	56	25	30	13	11	27
Gadwall	--	51	1	15	4	8	9	12	8	25
American widgeon	10	14	24	22	37	24	33	36	32	30
Green-winged teal	--	10	6	6	14	10	19	15	19	17
Blue-winged teal	13	10	8	4	27	30	37	14	11	21
Shoveler	--	--	6	6	11	12	26	17	16	11
Pintail	7	13	30	57	13	20	21	9	15	13
Wood duck	--	--	--	--	--	--	--	--	--	--
Subtotal	299	341	337	360	429	307	367	299	285	561
Divers:										
Redhead	--	--	34	22	11	10	17	18	13	30
Canvasback	22	20	103	50	11	32	37	24	17	26
Scaup	251	310	209	211	235	256	197	248	206	340
Ring-necked duck	--	--	11	15	92	121	42	78	151	94
Goldeneye	69	180	2	73	115	47	23	17	35	17
Bufflehead	20	17	31	22	40	27	9	16	27	33
Ruddy duck	--	--	--	7	11	4	1	3	3	5
Subtotal	362	527	390	400	515	497	326	404	452	545

TABLE B-47. ---Ten-year trend in waterfowl breeding population indexes by species
 northern Saskatchewan, northern Manitoba, and northern Ontario, 1958 to 1967 ---
 continued

/index numbers in thousands/

Species	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967
Ducks:										
Miscellaneous:										
Merganser	218	103	253	127	191	166	109	145	149	209
Scoter	36	58	15	34	23	22	8	7	30	28
Oldsquaw	--	--	--	--	--	--	--	--	--	1
Subtotal	254	161	168	161	214	188	117	152	179	238
Total ducks	915	1,029	895	921	1,158	992	810	855	916	1,344
Geese:										
Canada goose	--	24	8	11	11	31	28	17	27	42
Coots	--	51	11	30	6	18	17	16	10	19
Grand total	915	1,104	914	962	1,175	1,041	855	888	953	1,405

TABLE B-48.--Comparative status of waterfowl breeding population indexes by species and stratum, northern Saskatchewan, northern Manitoba, and northern Ontario, May 1967

/index numbers in thousands/

Species	Stratum					Total		Average 1958 1967	Percent change from	
	36	18	17	16	23	Previous year	Current year		Previous year	Average
Ducks:										
Dabblers:										
Mallard	47	41	85	136	108	173	417	237	+141	+ 76
Black duck	1	22	3	--	1	11	27	22	+145	+ 23
Gadwall	9	2	--	3	11	8	25	13	+243	+ 92
American widgeon	7	1	7	9	6	32	30	26	- 6	+ 15
Green-winged teal	2	2	8	2	3	19	17	12	- 11	+ 42
Blue-winged teal	5	1	5	6	4	11	21	18	+ 91	+ 17
Shoveler	9	1	--	--	1	16	11	11	- 31	0
Pintail	4	2	3	2	2	15	13	20	- 13	- 35
Wood duck	--	--	--	--	--	--	--	--	--	--
Subtotal	84	72	111	158	136	285	561	352	+ 97	+ 88
Divers:										
Redhead	16	2	--	2	10	13	30	16	+131	+ 88
Canvasback	13	1	4	1	7	17	26	34	+ 53	- 24
Scaup	67	41	29	86	117	206	340	246	+ 65	+ 38
Ring-necked duck	14	20	29	19	12	151	94	60	- 38	+ 57
Goldeneye	--	13	1	2	1	35	17	58	- 51	- 71
Bufflehead	7	2	1	12	11	27	33	24	+ 22	+ 38
Ruddy duck	2	--	--	--	3	3	5	3	+ 67	+ 67
Subtotal	119	79	64	122	161	452	545	442	+ 21	+ 24

TABLE B-48.--Comparative status of waterfowl breeding population indexes by species and stratum, northern Saskatchewan, northern Manitoba, and northern Ontario, May 1967 -- continued

/index numbers in thousands/

Species	Stratum							Total		Average 1958 1967	Percent change from Previous year		Average
	36	18	17	16	23			Previous year	Current year				
Ducks:													
Miscellaneous:													
Merganser	5	103	37	27	37		149		209	167	+ 40	+ 25	
Scoter	1	1	6	20	--		30		28	26	- 7	+ 8	
Oldsquaw	--	1	--	--	--		--		1	--	+100	+100	
Subtotal	6	105	43	47	37		179		238	183	+ 32	+ 30	
Total ducks	209	256	218	327	334		916		1,344	984	+ 47	+ 37	
Geese:													
Canada goose	1	22	5	11	3		27		42	20	+ 56	+110	
Coots	15	--	--	1	3		10		19	18	+ 90	+ 6	
Grand total	225	278	223	339	340		953		1,405	1,022	+ 47	+ 37	

TABLE B-49.--Waterfowl brood and late-nesting indexes by stratum compared to previous year and long-term averages, northern Saskatchewan and northern Manitoba, 1967

[index numbers in thousands]

Species	Stratum				Total		Average 1962 1967	Percent change from	
					Previous year	Current year		Previous year	Average
	16	23	36	17					
Broods:									
Duck brood index	102	49	31	46	100	228	116	+128.0	+ 96.6
Average brood size ¹	4.8	5.3	6.3	5.4	5.4	5.4	5.4	--	--
Coot brood index	--	1	9	--	10	10	7	--	+ 42.9
Late-nesting index ²									
Dabblers:									
Mallard	27	13	19	12	35	71	64	+102.9	+ 9.4
Black duck	--	--	--	3	--	3	--	--	--
Gadwall	--	--	1	1	1	2	3	+100.0	- 33.3
American widgeon	--	1	2	1	--	4	--	--	--
Green-winged teal	--	--	1	--	--	1	2	--	- 50.0
Blue-winged teal	--	1	1	--	2	2	3	--	- 33.3
Shoveler	--	1	2	--	3	3	3	--	--
Pintail	--	1	4	4	6	9	7	+ 50.0	+ 28.6
Subtotal	27	17	30	21	47	95	89	+102.1	+ 15.8

See footnotes p.

TABLE B-49.--Waterfowl brood and late-nesting indexes by stratum compared to previous year and long-term averages, northern Saskatchewan and northern Manitoba, 1967 -- continued

[index numbers in thousands]

Species	Stratum				Total		Average 1962 1967	Percent change from Previous year	
					Previous year	Current year		Average	
	16	23	36	17	year	year			
Late-nesting index ²									
Divers:									
Redhead	--	--	3	--	3	3	4	--	- 25.0
Canvasback	--	--	2	--	3	2	4	- 33.3	- 50.0
Scaup	27	17	7	6	31	57	59	+ 83.9	- 3.4
Ring-necked duck	9	11	3	6	36	29	29	- 19.4	--
Goldeneye	--	--	1	1	1	2	5	+100.0	- 60.0
Bufflehead	6	3	1	--	5	10	7	+100.0	+ 42.9
Ruddy duck	--	--	Tr.	--	2	--	2	-100.0	-100.0
Subtotal	42	31	17	13	81	103	116	+ 27.2	- 6.4
Miscellaneous	--	1	2	6	26	9	58	- 65.4	- 84.5
Grand total	69	49	49	40	154	207	165	+ 34.4	+ 25.4

¹ Class II and III broods only.

² As indicated by adult pairs and singles.

TABLE B-50. --Long-term pond indexes by strata and comparisons to average and previous years,
southern Saskatchewan, May and July, 1952 to 1967

[index numbers in thousands]

Year	Stratum				Total
	A-East	A-West	B-East	B-West	
May:					
1952	296.4	726.6	772.2	384.7	126.4
1953	508.1	974.6	1,362.3	678.7	203.3
1954	931.8	722.1	1,606.8	800.5	203.4
1955	1,295.0	886.6	1,103.3	549.7	198.4
1956	754.4	700.3	644.8	284.2	105.8
1957	292.3	357.9	576.2	148.5	72.2
1958	526.5	350.5	489.6	191.0	105.1
1959	157.7	160.2	334.5	57.4	73.6
1960	479.2	377.3	987.4	164.3	90.1
1961	48.7	171.1	221.4	92.0	55.7
1962	153.2	336.3	635.4	173.3	49.1
1963	239.4	256.0	293.9	131.6	39.5
1964	508.1	202.1	325.9	114.9	37.7
1965	393.6	453.0	484.9	224.4	81.4
1966	556.1	392.4	603.1	231.1	97.3
1967	449.1	523.3	746.2	216.8	142.1
Average 1952-1966	476.0	471.1	696.1	281.8	102.6
Percent change 1967 from 1966	- 19.2	+ 33.4	+ 23.7	- 6.2	+ 46.0
Percent change 1967 from average	- 5.7	+ 11.1	+ 7.2	- 23.1	+ 38.5
					+ 2.5

TABLE B-50:--Long-term pond indexes by strata and comparisons to average and previous years
southern Saskatchewan, May and July, 1952 to 1967--continued
[index numbers in thousands]

Year	Stratum				Total
	A-East	A-West	B-East	B-West	
July:					
1952	131.4	338.7	198.9	99.1	86.9
1953	748.9	812.8	593.5	295.7	100.5
1954	1,326.9	362.8	846.6	421.7	79.1
1955	1,493.6	889.9	785.3	391.2	233.7
1956	601.7	416.2	495.7	184.8	55.1
1957	403.4	250.2	437.7	127.7	35.3
1958	212.8	141.8	267.4	107.1	33.8
1959	143.0	120.5	145.0	36.8	26.0
1960	212.4	265.2	318.1	88.0	32.7
1961	34.4	50.6	61.2	37.1	9.8
1962	75.7	61.8	68.6	26.3	13.3
1963	173.8	227.4	161.8	84.5	41.6
1964	177.8	97.3	121.6	30.5	12.3
1965	157.3	280.1	288.5	102.8	92.6
1966	172.5	239.6	502.8	144.5	63.8
1967	94.0	193.4	218.0	80.9	45.9
Average 1952-1966	404.4	303.7	352.8	145.2	61.1
Percent change 1967 from 1966	- 45.5	- 19.3	- 56.6	- 44.0	- 28.1
Percent change 1967 from average	- 76.8	- 36.3	- 38.2	- 44.3	- 24.9
					- 50.1

TABLE B-51.--Long-term trend in waterfowl breeding population indexes by species, southern Saskatchewan, 1958 to 1967

[Index numbers in thousands]

Species	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967
Ducks:										
Dabblers:										
Mallard	2,999.8	1,642.9	1,589.5	994.6	674.1	774.4	671.4	537.4	862.5	982.9
Black duck	--	--	--	--	--	--	--	--	--	--
Gadwall	51.6	63.1	67.4	35.6	64.8	103.0	161.6	131.3	121.2	190.9
American widgeon	283.3	169.7	137.3	82.2	49.9	73.0	88.8	80.2	110.7	210.4
Green-winged teal	23.7	16.7	28.9	13.9	5.3	9.1	7.8	13.0	14.9	35.8
Blue-winged teal	202.5	153.5	132.7	92.2	38.5	59.0	125.5	105.2	154.4	203.6
Shoveler	202.8	146.6	294.1	108.7	27.6	101.4	177.4	112.4	268.2	258.5
Pintail	747.9	352.1	575.1	220.6	215.8	257.7	254.5	297.1	539.4	575.3
Wood duck	--	--	--	--	--	--	--	--	--	--
Subtotal	4,511.6	2,544.6	2,825.0	1,547.8	1,076.0	1,377.6	1,487.0	1,276.6	2,071.3	2,457.4
Divers:										
Redhead	61.9	40.8	50.5	23.5	57.6	14.0	31.6	35.3	45.7	47.5
Canvasback	160.9	61.2	61.0	82.9	94.6	52.4	57.5	60.8	100.5	70.5
Scaup	197.9	141.7	149.7	130.8	157.0	58.3	64.8	97.2	129.0	106.5
Ring-necked duck	5.8	26.7	7.5	3.3	--	5.7	10.4	10.5	8.7	6.4
Goldeneye	6.3	5.6	7.9	4.7	2.4	1.6	1.2	3.0	6.3	4.8
Bufflehead	13.8	11.8	12.0	11.2	1.5	10.0	9.1	19.8	12.9	14.2
Ruddy duck	21.8	114.8	28.9	27.3	13.4	9.9	10.0	12.3	19.5	12.7
Subtotal	468.4	402.6	317.5	283.7	326.5	151.9	184.6	238.9	322.6	262.6

TABLE B-51.--Long-term trend in waterfowl breeding population indexes by species,
southern Saskatchewan, 1958 to 1967 -- continued

[Index numbers in thousands]

Species	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967
Ducks:										
Miscellaneous:										
Merganser	--	0.5	11.4	4.0	--	5.4	1.4	1.8	--	0.7
Scoter	3.7	9.2	8.1	5.7	--	4.3	8.2	9.5	3.8	2.0
Subtotal	3.7	9.7	19.5	9.7	--	9.7	9.6	11.3	3.8	2.7
Total ducks	4,983.7	2,956.9	3,162.0	1,841.2	1,402.5	1,539.2	1,681.2	1,526.8	2,397.7	2,722.7
Geese:										
Canada goose	--	1.8	2.6	2.5	2.5	3.6	3.2	3.0	3.9	2.1
Coots	147.0	175.0	109.3	73.4	56.4	26.2	43.2	52.0	61.9	92.5
Grand total	5,130.7	3,133.7	3,273.9	1,917.1	1,461.4	1,569.0	1,727.6	1,581.8	2,463.5	2,817.3

TABLE B-52.--Comparative status of waterfowl breeding population indexes by species and stratum,
southern Saskatchewan, 1967
[index numbers in thousands]

Species	A-East (20)	A-West (19)	B-East (22)	B-West (21)	C (23)	Total		Average 1955 to 1966	Percent change from Previous year	Average change from
						Previous year	Current year			
Ducks:										
Dabblers:										
Mallard	157.4	313.9	244.6	166.1	100.9	862.5	982.9	1,440.8	+ 14.0	- 31.8
Black duck	--	--	--	--	--	--	--	0.1	--	--
Gadwall	10.0	102.4	30.8	24.9	22.8	121.2	190.9	94.8	+ 57.5	+101.4
American widgeon	23.0	74.8	55.6	31.0	26.0	110.7	210.4	149.6	+ 90.1	+ 40.6
Green-winged teal	3.5	17.9	6.4	4.4	3.6	14.9	35.8	23.2	+140.3	+ 54.3
Blue-winged teal	29.7	71.1	55.6	25.6	21.6	154.4	203.6	175.0	+ 31.9	+ 16.3
Shoveler	21.6	105.0	73.0	35.6	23.3	268.2	258.5	205.0	- 3.6	+ 26.1
Pintail	55.7	275.0	86.0	62.1	96.5	539.4	575.3	685.4	+ 6.7	- 16.1
Wood duck	--	--	--	--	--	--	--	--	--	--
Subtotal	300.9	960.1	552.0	349.7	294.7	2,071.3	2,457.4	2,773.9	+ 18.6	- 11.4
Divers:										
Redhead	4.1	12.5	15.4	12.7	2.8	45.7	47.5	58.5	+ 3.9	= 18.8
Canvasback	8.8	22.0	21.1	15.8	2.8	100.5	70.5	110.4	- 29.9	- 36.1
Scaup	16.2	32.4	40.4	14.0	3.5	129.0	106.5	202.6	- 17.4	- 47.4
Ring-necked duck	--	2.3	3.3	0.5	0.3	8.7	6.4	9.2	- 26.4	- 30.4
Goldeneye	--	--	3.3	1.5	--	6.3	4.8	5.3	- 23.8	- 9.4
Bufflehead	1.0	0.5	9.7	2.7	0.3	12.9	14.2	11.0	+ 10.1	+ 29.1
Ruddy duck	2.2	3.7	3.7	2.7	0.4	19.5	12.7	32.0	- 34.9	- 60.3
Subtotal	32.3	73.4	96.9	49.9	10.1	322.6	262.6	429.0	- 18.6	- 38.8

TABLE B-52.--Comparative status of waterfowl breeding population indexes by species and stratum,
southern Saskatchewan, 1967 -- continued

[index numbers in thousands]

Species	A-East (20)	A-West (19)	B-East (22)	B-West (21)	C (23)	Total		Average 1955 to 1966	Percent change from	
						Previous Year	Current year		Previous year	Average
Ducks:										
Miscellaneous:										
Merganser	--	0.1	0.6	--	--	--	0.7	2.1	--	- 66.7
Scoter	--	--	--	2.0	--	3.8	2.0	6.5	- 47.4	- 69.2
Subtotal	--	0.1	0.6	2.0	--	3.8	2.7	8.6	- 28.9	- 68.6
Total ducks	333.2	1,033.6	649.5	401.6	304.8	2,397.7	2,722.7	3,211.5	+ 13.6	- 15.2
Geese:										
Canada goose	--	0.3	1.2	--	0.6	3.9	2.1	1.9	- 46.2	+ 10.5
Coots	8.7	26.1	41.3	11.7	4.7	61.9	92.5	161.8	+ 49.4	- 42.8
Grand total	341.9	1,060.0	692.0	413.3	310.1	2,463.5	2,817.3	3,375.2	+ 14.4	- 16.5

TABLE B-53.--Lone drake index: Long-term trend expressed as percentage of total drakes, southern Saskatchewan, 1955-1967

Year	Percent of lone drakes ¹
1955	82.3
1956	78.5
1957	80.7
1958	80.2
1959	73.0
1960	84.7
1961	71.9
1962	47.3
1963	82.6
1964	83.5
1965	81.9
1966	82.9
1967	83.8

¹ Lone drakes include only mallards, pintails, and canvasback.

TABLE B-54.--Waterfowl brood and late-nesting indexes by stratum compared to previous year and long-term average, southern Saskatchewan, 1967

[index numbers in thousands]

Species	Stratum				Total		Average 1958 to 1966	Percent change from--	
	A-East	A-West	B-East	B-West	C	Previous year	Current year	1966	Average
Broods:									
Duck brood index	11.1	24.4	35.5	22.4	5.2	96.3	98.6	199.6 ³	+ 2.4 - 50.6
Average brood size ¹	5.6	5.5	5.5	5.3	5.7	6.0	5.5	5.3 ³	- 8.3 + 3.8
Coot brood index	2.5	1.1	6.6	2.2	0.4	7.6	11.8	31.8 ³	+ 55.3 - 62.9
Late-nesting index²									
Dabblers:									
Mallard	1.7	15.0	6.2	2.7	1.2	46.3	26.8	41.6	- 42.1 - 35.6
Gadwall	0.6	7.7	1.6	1.8	2.5	17.2	14.2	8.8	- 17.4 + 61.4
American widgeon	0.7	4.0	0.8	1.2	--	7.7	6.7	5.8	- 13.0 + 15.5
Green-winged teal	--	0.6	1.6	1.6	0.2	4.1	4.0	1.1	- 2.4 + 263.6
Blue-winged teal	1.5	10.2	5.5	2.2	3.5	26.5	22.9	13.8	- 13.6 + 65.9
Shoveler	0.6	2.3	1.5	0.4	1.1	5.2	5.9	3.8	+ 13.5 + 55.3
Pintail	0.9	5.0	--	3.1	--	10.7	9.0	5.9	- 15.9 + 52.5
Subtotal	6.0	44.8	17.2	13.0	8.5	117.7	89.5	80.8	- 24.0 + 10.8
Divers:									
Redhead	--	1.2	1.5	--	1.6	3.6	4.3	1.9	+ 19.4 + 126.3
Canvasback	0.2	1.2	0.8	--	0.2	0.4	2.4	1.1	+500.0 + 118.2
Scaup	0.6	0.4	0.8	0.8	0.2	8.2	2.8	6.7	- 65.9 - 58.2
Ring-necked duck	--	--	0.8	--	--	0.2	0.8	0.8	+300.0 --
Goldeneye	--	--	--	--	--	--	--	0.2	--
Bufflehead	--	0.2	0.8	0.8	0.2	2.8	2.0	0.6	- 28.6 + 233.3
Ruddy duck	0.2	2.2	7.0	2.7	0.9	12.5	13.0	6.2	+ 4.0 + 109.6
Subtotal	1.0	5.2	11.7	4.3	3.1	27.7	25.3	17.5	- 8.7 + 44.6

Footnotes p.

TABLE B-54.--Waterfowl brood and late-nesting indexes by stratum compared to previous year and long-term average, southern Saskatchewan, 1967--continued
(index numbers in thousands)

Species	Stratum				Total		Average 1958 to 1966	Percent change from--	
	A-East	A-West	B-East	B-West	C	Previous year	Current year	1966	Average
Miscellaneous ducks	--	--	--	--	--	--	--	--	--
Total ducks	7.0	50.0	28.9	17.3	11.6	145.4	114.8	98.8	- 21.1 + 16.2

1 Class II and III broods only.

2 As indicated by adult pairs and singles.

3 14-year average, 1952 to 1966.

TABLE B-55.--Long-term trend in pond indexes by strata and comparisons to average and previous year, southern Manitoba, May and July, 1967

[indexes in thousands]

Year	Stratum A	Stratum B	Total A and B
May:			
1954	258	428	686
1955	315	428	743
1956	391	615	1,006
1957	262	404	666
1958	352	264	616
1959	160	482	642
1960	324	295	619
1961	158	263	421
1962	135	295	430
1963	298	331	629
1964	398	331	729
1965	327	478	805
1966	372	515	887
1967	315	547	862
Average 1954 through 1966	288.5	394.5	683.0
Percent change from 1967 - 1966	- 15	+ 6	- 3
1967 from 1954 - 1966 average	+ 9	+39	+26
July:			
1954	473	384	857
1955	339	271	610
1956	425	411	836
1957	241	260	501
1958	163	341	504
1959	96	325	421
1960	164	212	376
1961	41	86	127
1962	97	135	232
1963	145	178	323
1964	201	182	383
1965	129	260	389
1966	167	240	407
1967	100	174	274
Average 1954 through 1966	206	253	459
Percent change from 1967 - 1966	-40	-27	-33
1967 from 1954 - 1966 average	-51	-31	-40

TABLE B-56.--Ten-year trend in waterfowl breeding population indexes by species, strata A and B, southern Manitoba, 1958 to 1967

[indexes in thousands]

Species	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967
Ducks:										
Dabblers:										
Mallard	490.5	303.6	322.1	211.1	129.2	182.0	167.0	147.0	192.1	193.0
Black duck	--	--	--	--	--	1.4	.2	--	.1	--
Gadwall	7.7	4.9	4.2	9.9	9.2	14.3	10.8	8.0	14.8	21.3
American widgeon	53.0	29.6	12.7	19.6	10.8	15.2	20.0	23.2	24.1	30.7
Green-winged teal	7.2	4.5	2.2	5.3	.4	4.7	.3	3.1	3.7	5.7
Blue-winged teal	124.9	140.8	94.9	84.1	43.9	47.0	38.2	32.5	26.1	60.2
Shoveler	28.2	36.0	53.6	38.6	17.4	33.3	38.0	32.2	28.9	42.5
Pintail	73.1	40.8	97.5	43.3	41.3	61.7	41.6	51.2	38.6	57.1
Wood duck	.2	--	--	--	--	--	--	--	--	--
Subtotal	784.8	560.2	587.2	411.9	252.2	359.6	316.1	297.2	328.4	410.5
Divers:										
Redhead	26.6	23.3	25.8	9.9	13.5	33.8	31.9	45.4	43.3	29.4
Canvasback	56.6	17.9	37.4	31.3	23.0	30.5	38.0	40.7	37.3	33.8
Scaup	70.5	48.0	145.9	114.8	76.1	55.7	72.3	67.1	72.9	79.5
Ring-necked duck	5.6	9.9	4.6	5.5	2.4	6.8	1.8	2.9	.5	4.1
Goldeneye	2.3	9.3	4.6	3.9	2.9	1.1	1.8	3.7	.5	4.7
Bufflehead	3.4	3.9	4.1	3.3	1.5	5.4	3.9	7.8	6.2	12.3
Ruddy duck	6.2	8.7	15.8	18.3	8.2	14.6	11.6	13.6	19.8	14.2
Subtotal	171.2	121.0	238.2	187.0	127.6	147.9	161.3	181.2	180.5	178.0

TABLE B-56.--Ten-year trend in waterfowl breeding population indexes by species, strata A and B
southern Manitoba, 1958 to 1967 -- continued

[indexes in thousands]

Species	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967
Ducks:										
Miscellaneous:										
Merganser	--	--	--	.1	--	--	4.0	3.2	2.0	--
Scoters	.7	--	--	1.5	--	.4	.6	1.0	1.8	1.6
Other	--	--	--	--	--	--	--	--	--	--
Subtotal	.7	--	--	1.6	--	.4	4.6	4.2	3.8	1.6
Total ducks	956.7	681.2	825.4	600.5	379.8	507.9	482.0	482.6	512.7	590.1
Coots	80.9	166.0	96.0	80.4	34.0	54.4	56.2	36.3	26.5	35.2
Grand total	1,037.6	847.2	921.4	680.9	413.8	562.3	538.2	518.9	539.2	625.3

TABLE B-57.--Comparative status of waterfowl breeding population indexes by species and stratum, southern Manitoba, 1967

[unadjusted]

Species	1967 Stratum		Totals (Strata A & B Combined)		Average 1953 to 1966	Percent change 1967 index from 14-year average	
	A	B	1966	1967		1966	1967
Ducks:							
Dabblers:							
Mallard	87,200	105,800	192,100	193,000	278,100	No change	- 31
Black duck	--	--	100	--	200	--	--
Gadwall	10,100	11,200	14,800	21,300	8,500	+ 44	+151
American widgeon	14,300	16,400	24,100	30,700	22,700	+ 27	+ 35
Green-winged teal	2,100	3,600	3,700	5,700	3,400	+ 54	+ 68
Blue-winged teal	30,200	30,000	26,100	60,200	67,300	+131	- 11
Shoveler	19,300	23,200	28,900	42,500	30,000	+ 47	+ 42
Pintail	28,300	28,800	38,600	57,100	69,700	+ 48	- 18
Wood duck	--	--	--	--	--	--	--
Subtotal	191,500	219,000	328,400	410,500	479,900	+ 25	- 14
Divers:							
Redhead	10,900	18,500	43,300	29,400	24,700	- 32	+ 19
Canvasback	18,300	15,500	37,300	33,800	32,400	- 9	+ 4
Scaup	50,900	28,600	72,900	79,500	73,900	+ 9	+ 8
Ring-necked duck	2,300	1,800	500	4,100	4,000	+720	+ 3
Goldeneye	2,200	2,500	500	4,700	3,600	+840	+ 31
Bufflehead	3,000	9,300	6,200	12,300	4,000	+ 98	+208
Ruddy duck	7,000	7,200	19,800	14,200	10,500	- 28	+ 35
Subtotal	94,600	83,400	180,500	178,000	153,100	- 1	+ 16

TABLE B-57.--Comparative status of waterfowl breeding population indexes by species and stratum, southern Manitoba, 1967 -- continued

[unadjusted]

Species	1967 Stratum		Totals (Strata A & B Combined)		Average 1953 to 1966	Percent change 1967 index from 14-year average	
	A	B	1966	1967		1966	1967
Ducks:							
Miscellaneous:							
Merganser	--	--	2,000	--	700	--	--
Scaup	200	1,400	1,800	1,600	700	- 11	+129
Other	--	--	--	--	--	--	--
Subtotal	200	1,400	3,800	1,600	1,400	- 58	+ 14
Total ducks	286,300	303,800	512,700	590,100	634,400	+ 15	- 7
Geese:							
Canada goose	--	Tr.	--	Tr.	--	--	--
Coots	20,400	14,800	26,500	35,200	52,700	+ 33	- 33
Grand total	306,700	318,600	539,200	625,300	687,100	+ 16	- 9

TABLE B-58.--Lone drake index: Long-term trend expressed as percentage of total drakes, southern Manitoba, 1955 to 1967

Year	Percent lone drakes ¹
1953	70.1
1954	79.6
1955	87.5
1956	79.4
1957	88.9
1958	81.9
1959	70.0
1960	86.5
1961	67.5
1962	62.0
1963	83.7
1964	78.0
1965	73.8
1966	84.6
1967	83.4

¹ Lone drakes include only mallards, pintails, and canvasback.

TABLE B-59.--Breeding population index adjusted for visibility,¹ southern Manitoba, 1967

Species	Strata A and B combined		
	Aerial index	Visibility rate	Adjusted index
Mallards	193,000	.614	314,300
Pintails	57,100	.342	167,000
Blue-winged teal	60,200	.120	501,700
Other ducks	279,800	.401	698,200
Total ducks	590,100	.351	1,681,200
Ponds	862,000	.902	955,700

¹ No A/G transects located in stratum B. Strata A and B indexes combined and adjusted based on visibility rates resulting from 4 A/G transects in stratum A.

TABLE B-60.--Waterfowl brood and late-nesting indexes by stratum compared to previous year,
and long-term average, southern Manitoba, 1967

[index numbers in thousands]

Species	1967		1966		Totals		Average 1954 thru 1966	Percent change	
	Stratum A	Stratum B	Stratum A	Stratum B	Strata A and B combined 1967	1966		from-- 1966	13-year Average
Broods:									
Duck brood index	9.5	22.7	9.7	20.9	32.2	30.6	32.5	+ 5	- 1
Average brood size ¹	5.9	4.8	5.7	5.1	5.1	5.3	5.6	- 4	- 9
Coot brood index	3.3	9.7	4.9	4.0	13.0	8.9	8.4	+ 46	+ 55
Late nesting index: ²									
Dabblers:									
Mallard	3.7	2.5	4.6	2.2	6.2	6.8	14.8	- 9	- 58
Gadwall	.3	1.4	.4	--	1.7	.4	1.1	+325	+ 55
American widgeon	.9	4.0	.7	.7	4.9	1.4	3.1	+250	+ 58
Green-winged teal	.1	--	.3	--	.1	.3	.5	- 67	- 80
Blue-winged teal	1.7	.8	2.5	--	2.5	2.5	6.7	same	- 63
Shoveler	.4	--	--	.7	.4	.7	1.2	- 43	- 67
Pintail	.6	--	.2	2.2	.6	2.4	2.1	- 75	- 71
Subtotal	7.7	8.7	8.7	5.8	16.4	14.5	29.7	+ 13	- 45
Divers:									
Redhead	.1	.7	.8	.7	.8	1.5	1.5	- 47	- 47
Canvasback	.1	.7	.3	--	.8	.3	.9	+167	- 11
Scaup	.9	.7	.6	.7	1.6	1.3	3.1	+ 23	- 48
Ring-necked duck	.1	--	--	--	.1	--	.6	+	- 83
Goldeneye	--	--	--	.7	--	.7	.2	-	-
Bufflehead	--	--	--	--	--	--	.4	-	-
Ruddy duck	.6	3.2	4.3	4.0	3.8	8.3	5.3	- 54	- 28
Subtotal	1.8	5.3	6.0	6.1	7.1	12.1	12.0	- 41	- 41
Miscellaneous									
	--	--	--	--	--	--	.2	-	-
Total ducks	9.5	14.0	14.7	11.9	23.5	26.6	41.9	- 12	- 44

¹ Class II and III broods only.

² As indicated by adult pairs and singles.

TABLE B-61.--Trend in waterfowl breeding population indexes by species,
eastern Ontario, Quebec, and Labrador, 1955-1967¹

[index numbers in thousands]

Species	1955	1956	1963	1964	1965	1966	1967
Ducks:							
Dabblers:							
Mallard	0.9	9.5	47.2	25.3	11.8	14.2	23.1
Black duck	247.4	288.7	274.7	219.9	258.1	114.2	207.5
Gadwall	--	--	--	--	--	--	--
American widgeon	1.9	--	4.0	5.7	0.4	2.5	--
Green-winged teal	0.9	4.0	27.7	9.0	5.4	14.3	8.3
Blue-winged teal	--	--	--	2.6	1.3	1.2	0.7
Shoveler	--	--	--	--	--	--	--
Pintail	11.4	3.3	19.5	10.8	7.0	2.2	0.7
Wood duck	--	--	--	3.9	--	--	--
Subtotal	262.5	305.5	373.1	277.2	284.0	148.6	240.3
Divers:							
Redhead	0.8	--	--	--	--	--	--
Canvasback	--	--	0.5	--	--	--	--
Scaup	76.5	201.9	39.4	41.3	30.4	7.6	56.8
Ring-necked duck	--	2.9	28.3	15.4	18.0	12.1	12.6
Goldeneye	254.5	154.5	77.3	166.0	497.2	62.4	131.9
Bufflehead	--	21.5	64.1	15.1	37.2	12.2	4.0
Ruddy duck	--	--	--	--	--	--	--
Subtotal	331.8	380.8	209.6	237.8	582.8	94.3	205.3
Miscellaneous:							
Merganser	288.7	53.7	346.0	421.5	811.1	476.1	415.3
Scoter	82.6	265.6	50.6	7.6	78.2	10.3	54.6
Oldsquaw	--	--	--	3.2	--	1.2	--
Subtotal	371.3	319.3	396.6	432.3	889.3	487.6	469.9
Total ducks	965.6	1,005.6	979.3	947.3	1,756.1	730.5	915.5
Geese:							
Canada goose	64.9	108.4	122.5	70.4	81.0	36.7	36.6
Coots	--	--	--	--	--	--	--
Grand total	1,030.5	1,114.0	1,101.8	1,017.7	1,837.1	767.2	952.1

¹ No survey conducted 1957-1962.

TABLE B-62.--Comparative status of waterfowl breeding population indexes by species and stratum, eastern Ontario, Quebec, and Labrador, 1966-1967¹
[index numbers in thousands]

Species	Stratum ²		Total		Average 1955-67 ³	Percent change from		
	A	B	C	1966		1967	1966	Average
Ducks:								
Dabblers:								
Mallard	10.8	12.3	--	14.1	23.1	18.9	+ 63.8	+ 22.2
Black duck	49.5	75.3	82.7	114.2	207.5	230.1 ⁴	+ 81.6	- 9.8
American widgeon	--	--	--	2.5	--	2.9 ⁴	--	--
Green-winged teal	5.4	2.9	--	14.3	8.3	9.9 ⁵	- 41.9	- 16.1
Blue-winged teal	0.7	--	--	1.2	0.7	1.4 ⁵	- 41.6	- 50.0
Pintail	0.7	--	--	2.2	0.7	7.8	- 68.1	- 91.0
Subtotal	67.1	90.5	82.7	148.5	240.3	270.2	+ 61.8	- 12.3
Divers:								
Scaup	43.5	--	13.3	7.6	56.8	64.8	+647.3	- 12.3
Ring-necked duck	1.3	11.3	--	12.1	12.6	14.9 ⁶	+ 4.1	- 15.2
Goldeneye	21.6	89.0	21.3	62.5	131.9	192.0 ⁶	+111.0	- 31.3
Bufflehead	1.0	3.0	--	12.2	4.0	25.7 ⁶	- 67.2	- 84.4
Subtotal	67.4	103.3	34.6	94.4	205.3	297.4	+117.4	- 30.9
Miscellaneous:								
Merganser	19.9	136.8	258.7	476.1	415.4	401.8	- 12.7	+ 3.3
Scoter	--	54.6	--	10.3	54.6	78.5	+430.0	- 30.4
Oldsquaw	--	--	--	1.1	--	2.2 ⁷	--	--
Subtotal	19.9	191.4	258.7	487.5	470.0	482.5	- 3.6	- 2.6
Total ducks								
	154.4	385.2	376.0	730.5	915.6	1,050.1	+ 25.3	- 12.8
Geese:								
Canada goose	--	15.2	21.3	36.7	36.5	74.3	- 0.5	- 50.8

¹ No surveys 1957-1962.

² Stratum A--Mixed boreal

Stratum B--Main boreal

Stratum C--Open boreal/tundra

³ Averages are for 1955-56 and 1963-67.

⁴ Five years only.

⁵ Four years only.

⁶ Six years only.

⁷ Two years only.

TABLE B-63.--Long-term trend in lone drake index expressed as percentage of total drakes, eastern Canada, 1955-1967¹

Year	Lone drake index
1955	22.1
1956	47.1
1963	23.0
1964	53.2
1965	52.0
1966	55.1
1967	55.2

¹ Scoters, scaup and mergansers not included.

TABLE B-64.--Species population indexes and percent composition of waterfowl (broods not included) observed west of James Bay, July 1967

Species	Number observed	Index	Percent total	Percent ducks only
Ducks:				
Dabblers:				
Mallard	15	2,912	2.1	3.5
Black duck	228	44,255	32.5	52.8
American widgeon	13	2,523	1.9	3.0
Green-winged teal	2	388	0.3	0.5
Pintail	22	4,270	3.1	5.1
Scaup	26	5,047	3.7	6.0
Oldsquaw	6	1,165	0.8	1.4
Scoter	59	11,452	8.4	13.6
Merganser	61	11,840	8.7	14.1
Total ducks	432	83,852		
Geese:				
Canada goose	269	52,213	38.4	
Total waterfowl	701	136,065	99.9	100.0

TABLE B-65.--Broods observed west of James Bay, July 1967

Transect	Duck broods			Canada goose broods		
	I	II	III	I	II	III
W - 1	1	3/20		3	9/39	
W - 3	1	11/59	1/2			
W - 4	1	4/19	3/12		14/62	
W - 6	1	18/93	1/3		9/34	1/2
Totals	4	36/191	5/16	3	32/135	1/2
Average class II and III		5.07			4.15	
Total Young (all broods x average)		228			149	
Index (number observed x expansion factor)		44,255			28,921	

TABLE B-66.--Index for black ducks and Canada geese west of James Bay (assuming that singles represent later broods), July 1967

	Black duck	Canada goose
Adults (table 64)	44,255	52,213
Adults with broods (not included in table 64)	6,405	13,975
Young	34,744	28,921
Later young (represented by by singles observed)	48,914	11,258
Possible later index	134,318	106,367

C. WATERFOWL HARVEST DATA TABLES

TABLE C-1--Total duck and coot kill in the Pacific Flyway during the 1965 and 1966 hunting seasons (retrieved kill estimates adjusted for response bias; all figures include junior hunter estimates)

Species ¹	1965	1966	Percent change
Ducks:			
Dabblers:			
Mallard	995,900	1,187,100	+ 19
Domestic mallard	200	1,600	+ 700
Black X mallard	0	0	0
Gadwall	93,500	119,400	+ 28
American widgeon	353,900	460,100	+ 30
Green-winged teal	381,400	431,800	+ 13
Blue-winged and cinnamon teal	87,100	42,000	- 52
Shoveler	195,000	230,500	+ 18
Pintail	541,100	747,000	+ 38
Wood duck	41,200	27,500	- 33
Divers:			
Redhead	39,700	26,200	- 34
Canvasback	15,000	62,900	+ 319
Greater scaup	7,500	6,800	- 9
Lesser scaup	39,100	31,100	- 20
Ring-necked duck	21,000	22,200	+ 6
Goldeneye	42,500	23,500	- 45
Bufflehead	22,100	46,300	+ 110
Ruddy duck	29,400	31,900	+ 8
Sea ducks:			
Oldsquaw	0	200	++
Scoter	3,400	3,200	- 6
Miscellaneous:			
Common and red-breasted merganser	2,100	4,800	+ 129
Hooded merganser	1,000	1,600	+ 60
Others and unknown	3,000	200	- 93
Total ducks			
Retrieved	2,915,100	3,508,000	+ 20
Not retrieved	615,300	645,000	+ 5
Ducks killed	3,530,400	4,153,000	+ 18
Coots:			
Retrieved	107,700	167,600	+ 56
Not retrieved	71,000	88,200	+ 24
Coots killed	178,700	255,700	+ 43

¹Species composition derived from the 1965 and 1966 duck wing surveys.

TABLE C-2--Total goose kill in the Pacific Flyway during the 1965 and 1966 hunting seasons (retrieved kill estimates adjusted for response bias and kill by junior hunters)

Species ¹	1965	1966	Percent change
Canada goose ²	124,200	188,700	+ 52
Snow goose	39,800	175,500	+ 341
Blue goose	600	0	--
White-fronted goose	48,500	71,600	+ 48
Black brant	12,500	7,600	- 39
<hr/>			
Total geese:			
Retrieved	225,500	443,400	+ 97
Not retrieved	45,300	73,600	+ 62
Geese killed	270,800	517,000	+ 91

¹Species composition derived from the 1965 and 1966 goose tail surveys.

²Includes all subspecies.

TABLE C-3--Waterfowl hunting activity and bags of ducks and geese in the Pacific Flyway during the 1966 hunting season, with 1965 season comparisons

[Estimates unadjusted for response bias]

Hunting season	Duck bag limit	Days in duck season	Hunter days			Duck bag			Goose bag		
			Potential adult hunters	Days per potential adult hunter	State total	Seasonal bag per potential adult hunter	State total	Seasonal bag per potential adult hunter	State total	Seasonal bag per potential adult hunter	State total
Arizona:											
1965	5-5	90	7,730	4.73	39,700	5.31	43,100	0.17	1,400		
1966	5-10	90	8,630	4.48	42,000	6.62	59,900	0.31	2,800		
Percent change	--	--	+ 12	- 5	+ 6	+ 25	+ 39	+ 82	+100		
California:											
1965	5-10	75	140,020	5.65	859,200	12.58	1,849,600	1.14	166,700		
1966	7-7	75	150,810	5.87	961,800	13.94	2,206,400	2.23	352,100		
Percent change	--	--	+ 8	+ 4	+ 12	+ 11	+ 19	+ 96	+111		
Colorado: ²											
1965	4-8	90	2,640	5.21	14,900	5.19	14,400	0.13	400		
1966	5-10	90	3,590	4.69	18,300	6.69	25,200	0.25	900		
Percent change	--	--	+ 36	- 10	+ 23	+ 29	+ 75	+ 92	+125		
Idaho:											
1965	5-5	90	24,150	6.66	174,900	9.46	240,000	0.69	17,500		
1966	5-10	90	27,220	6.72	199,000	10.68	305,400	0.77	21,800		
Percent change	--	--	+ 13	+ 1	+ 14	+ 13	+ 27	+ 12	+ 25		
Montana: ²											
1965	4-8	90	18,240	5.93	117,700	7.26	139,000	0.37	7,000		
1966	6-6	90	21,010	5.44	124,200	8.83	194,900	0.28	6,100		
Percent change	--	--	+ 15	- 8	+ 6	+ 22	+ 40	- '24	- 13		
Nevada:											
1965	4-8	86	10,670	4.89	56,700	8.37	93,800	0.58	6,500		
1966	6-12	75	11,910	5.36	69,400	10.81	135,100	0.81	10,100		
Percent change	--	--	+ 12	+ 10	+ 22	+ 29	+ 44	+ 40	+ 55		

TABLE C-3-- Waterfowl hunting activity and bags of ducks and geese in the Pacific Flyway during the 1966 hunting season, with 1965 season comparisons--continued

[Estimates unadjusted for response bias]

Hunting season	Duck bag limit	Days in duck season	Hunter days			Duck bag		Goose bag	
			Potential adult hunters	Days per potential adult hunter	State ¹ total	Seasonal bag per potential adult hunter	State ¹ total	Seasonal bag per potential adult hunter	
New Mexico: ²									
1965	5-10	75	980	10.54	11,200	12.08	12,400	0.08	100
1966	6-12	75	1,150	4.83	6,000	6.41	7,800	0.54	700
Percent change	--	--	+ 17	- 54	- 46	- 47	- 37	+575	+600
Oregon:									
1965	4-8	90	44,190	4.42	212,400	6.72	311,800	0.73	33,500
1966	5-10	90	48,640	5.98	316,200	9.17	468,400	1.21	61,400
Percent change	--	--	+ 10	+ 35	+ 49	+ 36	+ 50	+ 66	+ 83
Utah:									
1965	5-5	90	25,300	6.69	184,000	12.74	338,500	0.31	8,300
1966	5-10	90	32,780	6.20	220,900	9.99	343,700	0.43	14,800
Percent change	--	--	+ 30	- 7	+ 20	- 22	+ 2	+ 39	+ 78
Washington:									
1965	5-5	90	65,290	5.80	411,400	9.36	641,300	0.34	22,900
1966	5-10	86	68,670	6.28	469,200	9.48	683,600	0.68	48,900
Percent change	--	--	+ 5	+ 8	+ 14	+ 1	+ 7	+100	+114
Wyoming: ²									
1965	5-5	90	1,350	4.97	7,300	6.10	8,700	0.48	700
1966	5-10	90	1,420	5.42	8,300	8.61	12,800	0.78	1,100
Percent change	--	--	+ 5	+ 9	+ 14	+ 41	+ 47	+ 62	+ 57
Flyway total:									
1965	--	--	340,600	5.63	2,089,500	10.30	3,692,300	0.75	264,800
1966	--	--	375,800	5.97	2,435,400	11.28	4,443,200	1.33	520,700
Percent change	--	--	+ 10	+ 6	+ 17	+ 10	+ 20	+ 77	+ 97

¹State totals include junior hunter estimates.

²Includes only that portion of the State lying within the Pacific Flyway.

³1965 estimates for the Pacific Flyway portion of New Mexico only based on very small sample that is not considered reliable.

TABLE C-4--Numbers of duck stamps sold in the Pacific Flyway, percent sold to nonhunter¹ (philatelists and conservationists), estimated numbers of potential adult hunters, percent of these that were active, and percent of active hunters that were successful

State	1965--Full year sales					1966--Full year sales				
	Total duck stamps sold	Percent sold to nonhunters	Number of potential adult hunters	Percent active	Percent successful	Total duck stamps sold	Percent sold to nonhunters	Number of potential adult hunters	Percent active	Percent successful
Arizona	7,859	1.68	7,727	79	75	8,773	1.62	8,631	78	80
California	141,664	1.16	140,021	85	86	153,308	1.63	150,809	83	86
Colorado ¹	2,641	0.16	2,637	83	80	3,637	1.18	3,594	83	82
Idaho	24,217	0.26	24,154	84	86	27,400	0.65	27,222	82	87
Montana ¹	18,307	0.36	18,241	83	84	21,156	0.67	21,014	83	85
Nevada	10,673	0.00	10,673	80	83	11,928	0.15	11,910	80	84
New Mexico ^{1 2}	984	0.54	980	100	92	1,170	1.54	1,152	84	82
Oregon	44,558	0.82	44,193	78	84	48,884	0.49	48,644	80	84
Utah	25,488	0.73	25,302	89	89	32,877	0.30	32,778	91	89
Washington	65,534	0.37	65,292	78	84	69,235	0.82	68,667	80	84
Wyoming ¹	1,354	0.22	1,351	82	83	1,430	0.82	1,418	81	92
Flyway total	343,279	0.79	340,571	83	85	379,798	1.04	375,839	82	85
Alaska	9,406	0.50	9,359	66	87	10,640	1.57	10,473	64	85
U. S. total	1,550,055	1.14	1,532,401	84	79	1,796,647	1.23	1,774,632	85	83

¹Includes only that portion of the State lying within the Pacific Flyway.

²1965 estimates for the Pacific Flyway portion of New Mexico only based on a very small sample that is not considered reliable.

TABLE C-5--Total duck and coot kill in the Central Flyway during the 1965 and 1966 hunting seasons (retrieved kill estimates adjusted for response bias; all figures include junior hunter estimates)

Species ¹	1965	1966	Percent change
Ducks:			
Dabblers:			
Mallard	315,000	687,700	+ 118
Domestic mallard	0	500	++
Black duck	500	1,700	+ 240
Black X mallard	200	0	--
Mottled duck	23,500	61,000	+ 160
Gadwall	120,900	210,300	+ 74
American widgeon	83,000	154,400	+ 86
Green-winged teal	158,000	235,000	+ 49
Blue-winged and cinnamon teal	34,200	35,100	+ 3
Shoveler	53,700	87,500	+ 63
Pintail	79,600	167,100	+ 110
Wood duck	26,500	31,900	+ 20
Divers:			
Redhead	62,600	71,400	+ 14
Canvasback	24,100	39,700	+ 65
Greater scaup	100	3,300	+3200
Lesser scaup	48,800	79,500	+ 63
Ring-necked duck	28,100	35,000	+ 25
Goldeneye	1,900	6,300	+ 232
Bufflehead	8,400	11,300	+ 35
Ruddy duck	5,800	7,000	+ 21
Sea ducks:			
Oldsquaw	100	300	+ 200
Scoter	200	200	0
Miscellaneous:			
Common and red-breasted merganser	700	1,200	+ 71
Hooded merganser	4,300	3,900	- 9
Others and unknown	100	100	0
Total ducks:			
Retrieved	1,080,100	1,931,600	+ 79
Not retrieved	305,800	475,200	+ 55
Ducks killed	1,386,000	2,406,800	+ 74
Coots:			
Retrieved	39,800	41,900	+ 5
Not retrieved	19,600	26,600	+ 36
Coots killed	59,300	68,500	+ 16

¹Species composition derived from the 1965 and 1966 duck wing surveys.

TABLE C-6--Total goose kill in the Central Flyway during the 1965 and 1966 hunting seasons (retrieved kill estimates adjusted for response bias and kill by junior hunters)

Species ¹	1965	1966	Percent change
Canada goose ²	83,000	193,000	+ 133
Snow goose	72,300	136,000	+ 88
Blue goose	36,300	55,800	+ 54
White-fronted goose	13,400	34,400	+ 157
Brant	0	300	++
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Total geese:			
Retrieved	205,100	419,400	+ 104
Not retrieved	41,400	70,500	+ 70
Geese killed	246,500	489,900	+ 99

¹Species composition derived from the 1965 and 1966 goose tail surveys.

² Includes all subspecies.

TABLE C-7--Waterfowl hunting activity and bags of ducks and geese in the Central Flyway during the 1966 hunting season, with 1965 season comparisons

[Estimates unadjusted for response bias]

Hunting season	Duck bag limit	Days in duck season	Hunter days			Duck bag			Goose bag		
			Potential adult hunters	Days per potential adult hunter	State ¹ total	Seasonal		State ¹ total	Seasonal		
						bag per potential adult hunter	bag per potential adult hunter		bag per potential adult hunter	bag per potential adult hunter	
Colorado: ³											
1965	4-8	36 ²	18,660	4.81	97,300	2.88	57,100	0.57	11,100	0.57	11,100
1966	3-6	60	26,690	5.45	158,000	3.91	110,600	0.51	14,100	0.51	14,100
Percent change	--	--	+ 43	+ 13	+ 62	+ 36	+ 94	- 11	+ 27	- 11	+ 27
Kansas:											
1965	4-8	40 ²	32,280	4.78	167,400	3.97	136,000	0.35	11,800	0.35	11,800
1966	3-6	54 ²	34,770	5.73	216,200	5.34	197,100	0.39	14,000	0.39	14,000
Percent change	--	--	+ 8	+ 20	+ 29	+ 34	+ 45	+ 11	+ 19	+ 11	+ 19
Montana: ³											
1965	4-8	36 ²	4,800	3.77	19,600	3.09	15,700	0.29	1,400	0.29	1,400
1966	3-6	60	6,060	5.05	33,200	5.97	38,400	0.28	1,700	0.28	1,700
Percent change	--	--	+ 26	+ 34	+ 69	+ 93	+145	- 3	+ 21	- 3	+ 21
Nebraska:											
1965	4-8	40	24,110	5.31	138,900	4.56	116,600	0.60	15,000	0.60	15,000
1966	3-6	60	31,940	7.48	259,400	6.86	232,300	0.59	19,700	0.59	19,700
Percent change	--	--	+ 32	+ 41	+ 87	+ 50	+ 99	- 2	+ 31	- 2	+ 31
New Mexico: ³											
1965	4-8	40	3,470	4.31	16,200	3.69	13,600	0.25	900	0.25	900
1966	4-8	50	4,420	5.40	25,900	6.61	31,000	0.42	1,900	0.42	1,900
Percent change	--	--	+ 27	+ 25	+ 60	+ 79	+128	+ 68	+111	+ 68	+111
North Dakota:											
1965	4-8	40	33,870	5.89	216,600	7.42	266,600	1.11	39,200	1.11	39,200
1966	4-8	50	38,800	7.03	296,000	10.48	431,500	1.43	57,900	1.43	57,900
Percent change	--	--	+ 15	+ 19	+ 37	+ 41	+ 62	+ 29	+ 48	+ 29	+ 48

TABLE C-7--Waterfowl hunting activity and bags of ducks and geese in the Central Flyway during the 1966 hunting season, with 1965 season comparisons--continued

[Estimates unadjusted for response bias]

Hunting season	Duck bag limit	Days in duck season	Potential adult hunters	Hunter days		Duck bag		Goose bag	
				Days per adult hunter	State ¹ total	Seasonal bag per adult hunter	State ¹ total	Seasonal bag per adult hunter	State ¹ total
Oklahoma:									
1965	4-8	40	20,840	5.14	116,300	3.85	85,000	0.38	8,300
1966	3-6	60	25,580	6.52	181,000	6.89	186,900	0.74	19,700
Percent change	--	--	+ 23	+ 27	+ 56	+ 79	+120	+ 95	+137
South Dakota:									
1965	4-8	40	30,840	6.35	212,800	6.04	197,600	1.84	58,900
1966	3-6	60	35,500	7.54	290,600	9.06	341,300	1.54	56,800
Percent change	--	--	+ 15	+ 19	+ 37	+ 50	+ 73	- 16	- 4
Texas:									
1965	4-8	40	87,610	4.23	402,700	6.11	567,700	0.97	88,500
1966	4-8	50	99,780	5.93	642,400	9.62	1,018,200	2.84	295,400
Percent change	--	--	+ 14	+ 40	+ 60	+ 57	+ 79	+193	+234
Wyoming: ³									
1965	4-8	40	1,800	4.38	8,500	2.97	5,700	0.59	1,100
1966	3-6	54 ²	4,140	5.81	26,100	6.04	26,600	0.41	1,800
Percent change	--	--	+130	+ 33	+207	+103	+367	- 31	+ 64
Flyway total:									
1965	--	--	258,300	4.99	1,396,400	5.35	1,461,600	0.88	236,200
1966	--	--	307,700	6.38	2,128,800	8.04	2,613,700	1.52	483,000
Percent change	--	--	+ 19	+ 28	+ 52	+ 50	+ 79	+ 73	+104

¹State totals include junior hunter estimates.

²Indicates split season.

³Includes only that portion of the State lying within the Central Flyway.

TABLE C-8--Numbers of duck stamps sold in the Central Flyway, percent sold to nonhunters (philatelists and conservationists), estimated numbers of potential adult hunters, percent of these that were active, and percent of active hunters that were successful

State	1965--Full year sales					1966--Full year sales				
	Total duck stamps sold	Percent sold to nonhunters	Number of potential adult hunters	Percent active	Percent successful	Total duck stamps sold	Percent sold to nonhunters	Number of potential adult hunters	Percent active	Percent successful
Colorado ¹	18,688	0.16	18,658	77	70	27,005	1.18	26,686	79	76
Kansas ¹	32,384	0.33	32,277	79	72	35,264	1.40	34,770	82	76
Montana ¹	4,813	0.36	4,796	77	72	6,100	0.67	6,059	80	84
Nebraska ¹	24,382	1.13	24,106	79	80	32,284	1.06	31,942	84	83
New Mexico ¹	3,486	0.54	3,467	83	71	4,489	1.54	4,420	89	79
North Dakota	33,983	0.34	33,867	89	82	39,070	0.68	38,804	92	90
Oklahoma	20,870	0.17	20,835	77	71	25,723	0.55	25,582	82	78
South Dakota	31,071	0.73	30,844	84	81	35,695	0.55	35,499	88	89
Texas	88,325	0.81	87,610	79	79	101,161	1.36	99,785	82	86
Wyoming ¹	1,802	0.22	1,798	71	64	4,178	0.82	4,144	84	86
Flyway total	259,804	0.60	258,258	80	77	310,969	1.05	307,691	84	84

¹Includes only that portion of the State lying within the Central Flyway.

TABLE C-9--Total duck and coot kill in the Mississippi Flyway during the 1965 and 1966 hunting seasons (retrieved kill estimates adjusted for response bias; all figures include junior hunter estimates)

Species ¹	1965	1966	Percent change
Ducks:			
Dabblers:			
Mallard	925,000	1,656,400	+ 79
Domestic mallard	5,700	4,700	- 18
Black duck	103,600	126,300	+ 22
Black X mallard	4,500	3,900	- 13
Mottled duck	30,200	51,700	+ 71
Gadwall	220,800	295,900	+ 34
American widgeon	212,700	312,100	+ 47
Green-winged teal	215,100	362,600	+ 69
Blue-winged teal	142,500	223,500	+ 57
Shoveler	76,300	108,400	+ 42
Pintail	116,900	223,000	+ 91
Wood duck	337,600	495,800	+ 47
Divers:			
Redhead	65,800	94,900	+ 44
Canvasback	46,800	59,200	+ 26
Greater scaup	13,900	40,800	+ 194
Lesser scaup	337,000	288,400	- 14
Ring-necked duck	320,900	301,000	- 6
Goldeneye	30,800	43,000	+ 40
Bufflehead	47,600	43,400	- 9
Ruddy duck	22,800	19,100	- 16
Sea ducks:			
Olasquaw	600	1,300	+ 117
Eider	100	0	--
Scoter	3,500	6,000	+ 71
Miscellaneous:			
Common and red-breasted merganser	3,400	6,000	+ 76
Hooded merganser	30,200	28,600	- 5
Others and unknown	1,200	1,000	- 17
Total ducks:			
Retrieved	3,315,400	4,797,300	+ 45
Not retrieved	799,000	1,149,000	+ 44
Ducks killed	4,114,400	5,946,300	+ 45
Coots:			
Retrieved	385,400	629,400	+ 63
Not retrieved	101,600	177,700	+ 75
Coots killed	487,000	807,000	+ 66

¹Species composition derived from the 1965 and 1966 duck wing surveys.

TABLE C-10--Total goose kill in the Mississippi Flyway during the 1965 and 1966 hunting seasons (retrieved kill estimates adjusted for response bias and kill by junior hunters)

Species ¹	1965	1966	Percent change
Canada goose ²	139,800	151,800	+ 9
Snow goose	42,000	55,300	+ 32
Blue goose	53,500	100,200	+ 87
White-fronted goose	17,700	41,400	+ 134
Brant	0	trace	+
Unknown	700	1,000	+ 43
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Total geese:			
Retrieved	253,700	349,700	+ 38
Not retrieved	42,700	53,800	+ 26
Geese killed	296,400	403,600	+ 36

¹Species composition derived from the 1965 and 1966 goose tail surveys.

²Includes all subspecies.

TABLE C-11--Waterfowl hunting activity and bags of ducks and geese in the Mississippi Flyway during the 1966 hunting season, with 1965 season comparisons

[Estimates unadjusted for response bias]

Hunting season	Duck bag limit	Days in duck season	Potential adult hunters	Hunter days			Duck bag			Goose bag		
				Days per potential adult hunter	State ¹ total	Seasonal bag per potential adult hunter	State ¹ total	Seasonal bag per potential adult hunter	State ¹ total	Seasonal bag per potential adult hunter		
Alabama:												
1965	4-8	40	12,630	5.86	79,200	5.65	74,700	0.48	6,300			
1966	4-8	45	15,480	6.14	101,700	6.16	99,900	0.39	6,200			
Percent change	--	--	+ 23	+ 5	+ 28	+ 9	+ 34	- 19	- 2			
Arkansas:												
1965	4-8	40	21,850	7.79	182,200	11.75	268,600	0.04	800			
1966	4-8	45	35,330	7.71	291,600	12.12	448,200	0.03	1,100			
Percent change	--	--	+ 62	- 1	+ 60	+ 3	+ 67	- 25	+ 38			
Illinois:												
1965	4-8	40	55,470	6.01	356,600	4.36	253,000	0.43	24,400			
1966	4-8	45	65,290	6.72	469,300	6.83	466,400	0.54	36,300			
Percent change	--	--	+ 18	+ 12	+ 32	+ 57	+ 84	+ 26	+ 49			
Indiana:												
1965	4-8	36 ²	17,010	4.39	79,900	2.37	42,100	0.20	3,400			
1966	4-8	40 ²	19,440	4.64	96,500	3.15	64,100	0.28	5,600			
Percent change	--	--	+ 14	+ 6	+ 21	+ 33	+ 52	+ 40	+ 65			
Iowa:												
1965	4-8	40	39,670	6.11	259,400	5.20	215,900	0.91	37,400			
1966	4-8	45	46,840	7.13	357,400	7.33	359,200	0.65	31,400			
Percent change	--	--	+ 18	+ 17	+ 38	+ 41	+ 66	- 29	- 16			
Kentucky:												
1965	4-8	40	7,010	6.03	45,200	3.79	27,800	0.45	3,200			
1966	4-8	45	8,340	5.99	53,500	3.74	32,700	0.62	5,300			
Percent change	--	--	+ 19	- 1	+ 18	- 1	+ 18	+ 37	+ 66			

TABLE C-11.--Waterfowl hunting activity and bags of ducks and geese in the Mississippi Flyway during the 1966 hunting season, with 1965 season comparisons--continued

[Estimates unadjusted for response bias]

Hunting season	Duck bag limit	Days in duck season	Hunter days			Duck bag			Goose bag		
			Potential adult hunters	Days per potential adult hunter	State ¹ total	Seasonal bag per potential adult hunter	State ¹ total	Seasonal bag per potential adult hunter	State ¹ total	Seasonal bag per potential adult hunter	State ¹ total
Louisiana:											
1965	4-8	40	81,060	6.76	586,700	14.13	1,214,200	0.75	63,200		
1966	4-8	45	104,680	7.50	840,500	15.22	1,667,900	1.53	165,200		
Percent change	--	--	+ 29	+ 11	+ 43	+ 8	+ 37	+104	+161		
Michigan:											
1965	4-8	40	74,340	4.67	371,600	3.47	269,700	0.18	13,600		
1966	4-8	45	84,240	4.96	447,200	4.34	382,200	0.14	12,400		
Percent change	--	--	+ 13	+ 6	+ 20	+ 25	+ 42	- 22	- 9		
Minnesota:											
1965	4-8	40	122,270	5.52	721,900	6.50	831,100	0.28	35,100		
1966	4-8	45	150,070	5.71	916,300	7.92	1,244,000	0.21	32,300		
Percent change	--	--	+ 23	+ 3	+ 27	+ 22	+ 50	- 25	- 8		
Mississippi:											
1965	4-8	40	13,280	5.11	72,600	6.53	90,800	0.11	1,600		
1966	4-8	45	18,500	4.81	95,200	7.01	135,700	0.05	1,000		
Percent change	--	--	+ 39	- 6	+ 31	+ 7	+ 49	- 55	- 38		
Missouri:											
1965	4-8	40	36,480	5.12	200,000	3.83	146,100	1.13	42,500		
1966	4-8	45	40,390	5.68	245,300	4.52	191,100	1.72	72,000		
Percent change	--	--	+ 11	+ 11	+ 23	+ 18	+ 31	+ 52	+ 69		
Ohio:											
1965	4-8	36 ²	25,510	5.57	152,000	4.57	122,000	0.23	6,100		
1966	4-8	41 ²	30,400	5.34	173,500	4.30	136,900	0.16	5,200		
Percent change	--	--	+ 19	- 4	+ 14	- 6	+ 12	- 30	- 15		

TABLE C-11--Waterfowl hunting activity and bags of ducks and geese in the Mississippi Flyway during the 1966 hunting season, with 1965 season comparisons--continued

[Estimates unadjusted for response bias]

Hunting season	Duck bag limit	Days in duck season	Hunter days			Duck bag			Goose bag		
			Potential adult hunters	Days per potential adult hunter	State total	Seasonal bag per potential adult hunter	State total	Seasonal bag per potential adult hunter	State total	Seasonal bag per potential adult hunter	State total
Tennessee:											
1965	4-8	40	16,500	6.41	113,100	5.51	95,200	0.13	2,300	0.13	2,300
1966	4-8	45	23,740	6.72	170,600	7.71	191,600	0.18	4,400	0.18	4,400
Percent change	--	--	+ 44	+ 5	+ 51	+ 40	+101	+ 38	+ 91	+ 38	+ 91
Wisconsin:											
1965	4-8	40	104,150	6.72	748,300	5.67	618,100	0.55	59,100	0.55	59,100
1966	4-8	45	107,570	5.78	665,000	6.73	757,800	0.31	34,000	0.31	34,000
Percent change	--	--	+ 3	- 14	- 11	+ 19	+ 23	- 44	- 42	- 44	- 42
Flyway total:											
1965	--	--	627,200	5.92	3,968,700	6.55	4,269,300	0.47	299,200	0.47	299,200
1966	--	--	750,300	6.14	4,923,600	7.92	6,177,600	0.54	412,400	0.54	412,400
Percent change	--	--	+ 20	+ 4	+ 24	+ 21	+ 45	+ 15	+ 38	+ 15	+ 38

¹State totals include junior hunter estimates.

²Indicates split season.

TABLE C-12--Numbers of duck stamps sold in the Mississippi Flyway, percent sold to nonhunters (philatelists and conservationists), estimated numbers of potential adult hunters, percent of these that were active, and percent of active hunters that were successful

State	1965--Full year sales					1966--Full year sales				
	Total duck stamps sold	Percent sold to nonhunters	Number of potential adult hunters	Percent active	Percent successful	Total duck stamps sold	Percent sold to nonhunters	Number of potential adult hunters	Percent active	Percent successful
Alabama	12,691	0.45	12,634	89	70	15,865	2.40	15,484	87	76
Arkansas	21,969	0.55	21,848	88	88	35,625	0.83	35,329	84	89
Illinois	56,425	1.69	55,471	87	74	66,180	1.35	65,287	86	81
Indiana	17,188	1.01	17,014	83	63	19,880	2.23	19,437	83	70
Iowa	39,941	0.69	39,665	86	79	47,438	1.27	46,836	88	84
Kentucky	7,040	0.46	7,008	87	60	8,445	1.23	8,341	88	68
Louisiana	81,322	0.32	81,062	86	88	105,398	0.68	104,681	87	90
Michigan	75,348	1.34	74,338	85	68	84,967	0.86	84,236	84	75
Minnesota	125,752	2.77	122,269	90	83	151,415	0.89	150,067	93	87
Mississippi	13,326	0.34	13,281	84	83	18,604	0.53	18,505	83	80
Missouri	36,905	1.14	36,484	85	76	41,033	1.57	40,389	86	81
Ohio	26,065	2.12	25,512	87	75	31,176	2.50	30,397	88	75
Tennessee	16,731	1.40	16,497	87	70	23,909	0.69	23,744	89	80
Wisconsin	105,767	1.53	104,149	89	80	108,833	1.16	107,571	88	84
Flyway total	636,470	1.45	627,232	87	79	758,768	1.12	750,304	88	83

TABLE C-13--Total duck and coot kill in the Atlantic Flyway during the 1965 and 1966 hunting seasons (retrieved kill estimates adjusted for response bias; all figures include junior hunter estimates)

Species ¹	1965	1966	Percent change
Ducks:			
Dabblers:			
Mallard	160,700	217,900	+ 36
Domestic mallard	3,000	1,500	- 50
Black duck	216,700	279,300	+ 29
Black X mallard	10,500	6,700	- 36
Mottled duck	14,300	14,900	+ 4
Gadwall	19,000	24,100	+ 27
American widgeon	54,800	75,000	+ 37
Green-winged teal	71,000	84,000	+ 18
Blue-winged teal	20,800	33,000	+ 59
Shoveler	6,900	14,100	+ 104
Pintail	21,200	28,700	+ 35
Wood duck	153,400	190,500	+ 24
Divers:			
Redhead	14,800	19,700	+ 33
Canvasback	25,500	57,100	+ 124
Greater scaup	22,000	42,500	+ 93
Lesser scaup	24,700	78,300	+ 217
Ring-necked duck	64,200	98,300	+ 53
Goldeneye	20,800	17,700	- 15
Bufflehead	30,900	43,100	+ 39
Ruddy duck	3,400	11,900	+ 250
Sea ducks:			
Oldsquaw	3,100	7,500	+ 142
Eider	3,300	8,000	+ 142
Scoter	32,700	44,500	+ 36
Miscellaneous:			
Common and red-breasted merganser	7,700	8,700	+ 13
Hooded merganser	13,500	14,800	+ 10
Others	300	1,500	+ 400
Total ducks:			
Retrieved	1,019,200	1,423,600	+ 40
Not retrieved	266,200	342,700	+ 29
Ducks killed	1,285,400	1,766,300	+ 37
Coots:			
Retrieved	85,800	110,700	+ 29
Not retrieved	30,000	35,800	+ 19
Coots killed	115,800	146,400	+ 26

¹Species composition derived from the 1965 and 1966 duck wing surveys.

TABLE C-14--Total goose kill in the Atlantic Flyway during the 1965 and 1966 hunting seasons (retrieved kill estimates adjusted for response bias and kill by junior hunters)

Species ¹	1965	1966	Percent change
Canada goose ²	81,000	148,100	+ 83
Snow goose	0	0	0
Blue goose	100	trace	-
American brant	15,500	32,900	+ 112
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Total geese:			
Retrieved	96,600	181,000	+ 87
Not retrieved	15,900	27,100	+ 70
Geese killed	112,500	208,000	+ 85

¹Species composition derived from the 1965 and 1966 goose tail surveys.

²Includes all subspecies.

TABLE C-15--Waterfowl hunting activity and bags of ducks and geese in the Atlantic Flyway during the 1966 hunting season, with 1965 season comparisons

[Estimates unadjusted for response bias]

Hunting season	Duck bag limit	Days in duck season	Hunter days			Duck bag		Goose bag			
			Potential adult hunters	Days per potential adult hunter	State ¹ total	Seasonal		State ¹ total	Seasonal		
						bag per potential adult hunter	bag per potential adult hunter		bag per potential adult hunter	bag per potential adult hunter	
Connecticut:											
1965	3-6	45 ²	7,860	4.65	38,400	4.49	36,500	0.16	1,200		
1966	3-6	50 ²	9,330	4.52	44,400	3.16	30,500	0.16	1,600		
Percent change	--	--	+ 19	- 3	+ 16	- 30	- 16	0	+ 33		
Delaware:											
1965	3-6	50 ²	8,270	6.29	54,700	2.96	25,400	1.19	10,000		
1966	3-6	50 ²	9,010	7.04	66,800	4.71	44,000	2.32	21,400		
Percent change	--	--	+ 9	+ 12	+ 22	+ 59	+ 73	+ 95	+114		
Florida:											
1965	4-8	36 ²	24,650	4.79	124,100	6.32	161,300	0.03	600		
1966	4-8	41 ²	27,980	4.95	145,700	8.32	241,200	0.05	1,300		
Percent change	--	--	+ 14	+ 3	+ 17	+ 32	+ 50	+ 67	+117		
Georgia:											
1965	4-8	40	8,910	4.32	40,500	5.46	50,400	0.04	300		
1966	4-8	45	10,310	4.91	53,300	6.54	69,900	0.04	500		
Percent change	--	--	+ 16	+ 14	+ 32	+ 20	+ 39	0	+ 67		
Maine:											
1965	3-6	45 ²	11,880	4.92	61,400	5.01	61,400	0.14	1,600		
1966	3-6	55	13,330	5.07	71,100	5.36	73,700	0.09	1,300		
Percent change	--	--	+ 12	+ 3	+ 16	+ 7	+ 20	- 36	- 19		
Maryland: ³											
1965	3-6	50	25,100	5.96	154,200	3.22	83,700	1.40	35,400		
1966	3-6	55	27,750	7.11	202,900	7.10	199,500	2.60	71,300		
Percent change	--	--	+ 11	+ 19	+ 32	+120	+138	+ 86	+101		

TABLE C-15--Waterfowl hunting activity and bags of ducks and geese in the Atlantic Flyway during the 1966 hunting season, with 1965 season comparisons--continued

[Estimates unadjusted for response bias]

Hunting season	Duck bag limit	Days in duck season	Hunter days			Duck bag		Goose bag	
			Potential adult hunters	Days per potential adult hunter	State ¹ total	Seasonal bag per potential adult hunter	State ¹ total	Seasonal bag per potential adult hunter	
Massachusetts:									
1965	3-6	45 ²	19,850	5.14	107,400	4.06	82,700	0.30	6,200
1966	3-6	55	22,240	5.81	136,000	4.80	111,000	0.27	6,200
Percent change	--	--	+ 12	+ 13	+ 27	+ 18	+ 34	- 10	0
New Hampshire:									
1965	3-6	45 ²	5,790	6.04	36,800	3.78	22,600	0.12	700
1966	3-6	55	6,450	6.36	43,100	3.84	25,600	0.22	1,400
Percent change	--	--	+ 11	+ 5	+ 17	+ 2	+ 13	+ 83	+100
New Jersey:									
1965	3-6	45 ²	25,940	5.52	150,600	4.42	118,700	0.83	22,000
1966	3-6	50 ²	26,320	5.31	147,000	4.62	125,800	1.74	46,800
Percent change	--	--	+ 1	- 4	- 2	+ 5	+ 6	+110	+113
New York:									
1965	3-6	45 ²	56,470	4.95	294,100	3.50	204,200	0.23	13,100
1966	3-6	55	65,860	4.76	329,600	3.40	231,800	0.42	28,100
Percent change	--	--	+ 17	- 4	+ 12	- 3	+ 14	+ 83	+114
North Carolina: ³									
1965	3-6	50	21,810	4.47	102,400	3.02	68,300	0.44	9,900
1966	3-6	55	24,800	5.57	145,000	4.55	116,700	0.50	12,900
Percent change	--	--	+ 14	+ 25	+ 42	+ 51	+ 71	+ 14	+ 30
Pennsylvania:									
1965	3-6	45 ²	41,290	4.17	181,200	2.23	95,200	0.19	7,900
1966	3-6	50 ²	42,810	3.86	173,900	2.47	109,600	0.29	12,700
Percent change	--	--	+ 4	- 7	- 4	+ 11	+ 15	+ 53	+ 61

TABLE C-15--Waterfowl hunting activity and bags of ducks and geese in the Atlantic Flyway during the 1966 hunting season, with 1965 season comparisons--continued

[Estimates unadjusted for response bias]

Hunting season	Duck bag limit	Days in duck season	Hunter days				Duck bag		Goose bag	
			Potential adult hunters	Days per potential adult hunter	State ¹ total	Seasonal bag per potential adult hunter	State ¹ total	Seasonal bag per potential adult hunter	State ¹ total	
Rhode Island:										
1965	3-6	50	2,100	5.42	12,000	3.32	7,200	0.11	200	
1966	3-6	55	2,440	6.82	17,500	4.79	12,100	0.37	900	
Percent change	--	--	+ 16	+ 26	+ 46	+ 44	+ 68	+236	+350	
South Carolina:										
1965	3-6	50	14,810	5.37	83,600	5.37	82,400	0.06	900	
1966	4-8	45	16,450	6.12	105,800	7.46	127,100	0.08	1,300	
Percent change	--	--	+ 11	+ 14	+ 27	+ 39	+ 54	+ 33	+ 44	
Vermont:										
1965	3-6	50	4,730	4.53	22,500	4.25	20,800	0.18	900	
1966	3-6	55	4,980	5.99	31,400	4.46	23,000	0.48	2,400	
Percent change	--	--	+ 5	+ 32	+ 40	+ 5	+ 11	+167	+167	
Virginia: ³										
1965	3-6	50	15,970	3.94	66,000	2.95	49,000	0.52	8,800	
1966	3-6	55	18,720	4.71	92,500	4.81	92,800	0.76	14,700	
Percent change	--	--	+ 17	+ 20	+ 40	+ 63	+ 89	+ 46	+ 67	
West Virginia:										
1965	3-6	45 ²	1,590	3.12	5,200	1.65	2,700	0.14	200	
1966	3-6	49 ²	1,550	3.13	5,100	2.18	3,500	0.14	200	
Percent change	--	--	- 3	0	- 2	+ 32	+ 30	0	0	
Flyway total:										
1965	--	--	297,000	4.91	1,535,200	3.78	1,172,500	0.40	120,100	
1966	--	--	330,300	5.23	1,811,100	4.78	1,637,700	0.67	225,000	
Percent change	--	--	+ 11	+ 7	+ 18	+ 26	+ 40	+ 68	+ 87	

¹State totals include junior hunter estimates.

²Indicates split season.

³Portions of Washington, D. C. hunters and kill allocated to Maryland, North Carolina, and Virginia.

TABLE C-16--Numbers of duck stamps sold in the Atlantic Flyway, percent sold to nonhunters (philatelists and conservationists), estimated numbers of potential adult hunters, percent of these that were active, and percent of active hunters that were successful

State	1965--Full year sales				1966--Full year sales			
	Total duck stamps sold	Percent sold to nonhunters	Number of potential adult hunters	Percent active	Total duck stamps sold	Percent sold to nonhunters	Number of potential adult hunters	Percent active
Connecticut	8,341	5.77	7,860	76	9,548	2.32	9,326	78
Delaware	8,380	1.32	8,269	82	9,179	1.80	9,014	85
District of Columbia	2,151	11.64	1,901	83	2,520	3.38	2,435	83
Florida	24,821	0.71	24,645	82	28,514	1.89	27,975	82
Georgia	8,971	0.73	8,906	81	10,500	1.80	10,311	84
Maine	11,969	0.75	11,879	82	13,641	2.26	13,333	81
Maryland	24,315	1.77	23,885	80	26,435	0.90	26,197	82
Massachusetts	20,202	1.76	19,846	82	22,452	0.92	22,245	79
New Hampshire	5,809	0.39	5,786	83	6,563	1.67	6,453	83
New Jersey	26,350	1.56	25,939	83	26,928	2.26	26,319	81
New York	57,363	1.56	56,468	77	67,549	2.50	65,860	77
North Carolina	21,836	0.52	21,722	80	24,871	0.73	24,689	85
Pennsylvania	41,598	0.74	41,290	86	43,662	1.95	42,811	84
Rhode Island	2,203	4.67	2,100	78	2,500	2.35	2,441	72
South Carolina	14,916	0.74	14,806	86	16,576	0.77	16,448	90
Vermont	4,789	1.32	4,726	78	5,115	2.64	4,980	87
Virginia	15,475	0.73	15,362	75	18,278	1.84	17,942	81
West Virginia	1,607	0.98	1,591	75	1,641	5.79	1,546	78
Flyway total	301,096	1.37	296,981	81	336,472	1.83	330,325	82
				74				77

TABLE C-17--Waterfowl hunting activity and success in Alaska during the 1966 hunting season, with 1965 season comparisons

	1965	1966	Percent change
Daily duck bag and possession limit:	5-10	5-10	--
Days in duck season:	105	105	--
Potential adult waterfowl hunters:	9,360	10,470	+ 12
Season average per potential adult waterfowl hunter for:			
Hunter days	4.22	3.21	- 24
Ducks bagged	7.81	5.98	- 23
Geese bagged	0.94	0.80	- 15
Season total ¹ for adult and junior waterfowl hunters for:			
Hunter days	42,900	36,600	- 15
Ducks bagged	76,700	65,800	- 14
Geese bagged	9,200	8,700	- 5
Total bag by species: ²			
Mallard	--	13,200	--
Gadwall	--	1,500	--
American widgeon	--	8,500	--
Green-winged teal	--	9,100	--
Shoveler	--	1,600	--
Pintail	--	11,100	--
Lesser scaup	--	1,000	--
Goldeneye	--	2,600	--
Other ducks ³	--	3,300	--
Total retrieved duck kill	60,600	52,000	- 14
Total unretrieved duck kill	10,600	9,700	- 8
Total ducks killed	71,200	61,700	- 13
Canada goose	--	6,800	--
Other geese ⁴	--	600	--
Total retrieved goose kill	7,800	7,400	- 5
Total unretrieved goose kill	1,200	1,100	- 8
Total geese killed	9,000	8,500	- 6
Coots			
Total retrieved kill	700	900	+ 29
Total unretrieved kill	300	200	- 33
Total coots killed	1,000	1,100	+ 10

¹Total duck and goose bag estimates unadjusted for response bias.

²Total bag estimates by species adjusted for response bias. No species composition estimates available for 1965.

³See Administrative Report No. 133 for information on other species of ducks.

⁴See Administrative Report No. 136 for information on other species of geese.

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and faithfully to defend from
waste the natural resources of
my country—its soil and
minerals, forests,
waters, and
wildlife.**

